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OBESITY POLICY STRINGENCY OVER TIME: A FOUR STATE POLICY DESIGN STUDY

by

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ABSTRACT

OBESITY POLICY STRINGENCY OVER
TIME: A FOUR STATE POLICY DESIGN STUDY

Luisa M. Lucero
Old Dominion University, 2017
Director: Dr. Meagan M. Jordan

Over the past several decades obesity rates in the United States have increased exponentially, reaching epidemic proportions and placing heavy financial and health-related burdens on states. States could reduce their obesity-related spending by billions of dollars, however, if they reduced their obesity prevalence by five percent by 2030, which would reduce medical costs, loss of productivity, and loss of life. Despite the incentive to improve obesity rates, not all states are taking advantage of obesity-related policy as a means to combat obesity. Using a multiple case study design and policy design as the theoretical foundation, this study explores whether or not state policy design stringency, reflecting policy design prescriptiveness, changes as states experience an increase in obesity prevalence. This study also seeks to identify the factors that contribute to variation in state obesity-related policy stringency.

The results of this study indicate that states enacting a large number of highly stringent obesity-related policies will experience an improvement in obesity prevalence over time. States making minimal improvements will experience consistent obesity rates over time, while states that take no significant obesity-reducing policy steps will experience worsening obesity prevalence over time. In terms of the factors that lead to variation in policy design stringency, party sponsorship of obesity-related policy plays a key role, as does state affluence, and party in control of the state legislature in some cases. Party of the governor and contributions from health interest groups were not consistently present in years of high obesity policy stringency. This dissertation also offers implications of the findings and plans for future research.

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This dissertation is dedicated to my family.

To my parents, Nina, Marisa, Sebastian, and Jamie Jones, I could not have done this without you all. Your love, support, and patience over the past four years have been a necessary part of my success.

To Eric, I cannot thank you enough for the love that you have shown me throughout our relationship. You have been a cheerleader, therapist, a shoulder to cry on, and so many other things throughout this degree and I am excited to see what life has in store for us.

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CHAPTER ONE

INTRODUCTION

Often times when states are faced with a public problem they have access to several policy solution options that can be used to meet the policy goals they have set for alleviating the issue (Linders & Peters, 1988). To approach policy problems in the most efficient and effective way, governments rely on policy designs to create and develop the best actions and use of tools to achieve the intended policy outcome (Howlett, 2009; Dyzek, 1983). Policy design is defined as, "the process of inventing, developing, and fine-tuning a course of action with the amelioration of some problem [in mind]," and is a critical step in approaching policy problems (Dryzek, 1983, p. 346). Policy design can mean the difference between successfully meeting policy goals and failing to meet policy goals. If well thought out, policy design can be used to formulate and implement policies that increase the likelihood of residents changing social behaviors in a manner that alleviates burdens on state and federal governments (Linder & Peters, 1988). Good policy design is effective because it takes into account foreseeable constraints and barriers to determine the best, and most practical, course of action (Ingraham, 1987).

The use of policy design in the formulation of legislation can be difficult, however, due to the continuous presences of competing interest. Policy designers may approach a problem differently due to their preferences, the perceived policy constraints, as well as the political atmosphere that they are working in. These different influences often lead to many variations of policy design for a single issue (May, 1991; Koski, 2007a). Furthermore, the inability to agree about the importance of a policy problem can lead to variation in the strength, or stringency, of a policy. If policy designers want to ensure that the policy is effective, their use of language will

be prescriptive, but policy designers less concerned with the outcome of the policy will use more casual language (Koski, 2007a). Depending on the level of concern by the policy architect regarding the problem, variation in the strength of the policy design will exist.

To further explore the variation in policy design stringency, this dissertation will apply policy design to a state level policy issue, obesity. Obesity is quickly becoming a problem for all levels of governments. Mounting obesity rates in the United States have become an increasingly alarming problem since the 1970s. In the 1960s, only 13% of Americans were considered obese, but obesity rates reached epidemic proportions by 2001, when the percentage of Americans classified as obese rose to 31%. In the year 2015, more than 78.6 million or one-third of Americans were classified as obese (Center for Disease Control and Prevention, 2015). This continuous rise in obesity rates has occurred despite the Surgeon General's appeal for policy action and health officials' formal classification of obesity as an epidemic (National Institute of Diabetes and Digestive and Kidney Diseases, 2012; Surgeon General, 2001). The ineffective nature of such calls to action have raised concerns over obesity's social consequences, which is evidenced in its ranking of third in a list of social burdens humans cause, behind only smoking and armed violence and terrorism (Surgeon General, 2001; Dobbs & Sawers, 2014).

To successfully counteract the behaviors leading to high obesity rates, states have the opportunity to utilize public policy as a form of intervention to stabilize and reduce obesity rates (Roller, Voorhees, & Lunkenheimer, 2006). State level policy, in particular, has the potential to alter social norms by promoting programs that increase physical activity and create an environment where proper nutrition is easily obtainable (McKinnon et al., 2009; Eyler et al., 2012). Despite the problems associated with obesity in all 50 states, however, not all states are implementing policy at the same level of stringency to combat obesity. To explore why some

states increase obesity policy stringency to reduce obesity and others do not, policy design literature is used to investigate how states formulate policies aimed at reducing obesity rates and the associated health and financial consequences (Ingraham, 1987).

Analyzing the policy designs of obesity legislation, this dissertation has two main purposes. The first purpose is to analyze how state obesity policy stringency has changed over time as obesity prevalence has increased. The second purpose is to determine what factors contribute to variation in state obesity policy stringency over time.

Statement of the Problem

The steady increase in the number of Americans classified as obese has proven detrimental to state governments; resources are strained and state policymakers must manage the consequences associated with rising obesity rates. Between 1990 and 2014, the obesity rates in most states more than doubled (State of Obesity, 2016). Researchers specializing in obesity have projected that if current trends continue, all states may have obesity rates between 50% and 66% by 2030. Moreover, if major environmental and behavioral changes are not made, it is projected that national healthcare costs will climb to as high as $66 billion by 2030, increasing by as much as 35% at the state level (Trust for America's Health, 2012).

Most obesity related consequences are reversible, however, and bleak projections need not come to fruition. In theory, individuals in every state could pursue a combination of behavioral treatments for obesity including diet and exercise, weight loss drugs, and, in severe cases, bariatric surgery. In practice, not all treatment options are accessible due to barriers such as financial burdens of high-priced pharmaceuticals and surgeries. Medicaid and other government programs that may help cover obesity-related treatments vary from state to state. In

fact, only eight states cover all three categories of obesity intervention: nutritional consultation, drug therapy, and bariatric surgery (Lee, Sheer, Lopez, & Rosenbaum, 2010). Additionally, the diverse nature of each obese individual means that no one treatment fits all; different combinations of treatments tested through trial and error may be necessary to find a method that works (National Heart, Lung, and Blood Institute, 2013). States that are able to provide small changes that yield several affordable treatment options may benefit greatly as the percentage of obese residents declines. It is projected that states that decrease obesity rates by just five percent can save billions of dollars by 2030 through the reduction of obesity byproducts such as medical costs, loss of productivity, and loss of life (Trust for America's Health, 2012; Obesity Facts and Resources, 2014).

If states utilized policy design effectively they may be able to address obesity directly, which would positively affect health and financial costs for individuals as well as the state in which they reside, not to mention the country as a whole (Roller et al., 2006). Obesity reducing policies wield influence over environmental and behavioral changes by providing opportunities for individuals to develop healthier lifestyles (Eyler, Nguyen, Kong, Yan, & Brownson, 2012). Any policy concerned with nutrition, obesity reduction, or physical activity with the intention of promoting a healthy weight is considered an obesity policy (Niggel et al., 2013). States have historically relied on public policy to initiate programs such as placing iodine in salt and fluoride in water, both of which were designed to improve health-related conditions. Similar initiatives allow citizens to make healthy decisions more easily, influencing behavior among large populations (Luck et al., 2015).

Well-designed policy can also lead to shifts in public opinion on public health issues by framing new norms. For example, state anti-smoking policy has proven to successfully change

the social connotation of smoking, ultimately reducing the number of individuals buying and smoking tobacco (Johnston, Matteson, & Finegood, 2014). Designing policy in a way that garners positive attention and activism increases the likelihood of policy success (Walhart, 2013; Strand and Fosse, 2011). Obesity policy design has the potential to have the same impact as tobacco policy if it harnesses the opportunity to change social norms that result in obesity and lead individuals to pursue healthier behaviors (McKinnon et al., 2009).

Purpose of the Study

Though the impact of increasing obesity rates has reached all 50 states, there exists tremendous variation in the way state governments address the consequences of obesity. Studies show a weak relationship between the rate of obesity in a state and the number of obesity reducing policies passed by state legislatures, indicating obesity prevalence is not the primary reason that states pass obesity-reducing policies (Niggel et al., 2013). Currently, state obesity policy literature focuses on three main areas of state obesity policy: determinants that influence the enactment of obesity related policies (Boehmer, Luke, Haire-Joshu, Bates, & Brownson, 2008; Eyler, Nguyen, Kong, Yan, & Brownson, 2012; Cawley and Liu, 2008; Marlow, 2014; Jones, 2010; and Dodson et al., 2009), prevalence of obesity legislation at the state level (Hersey et al, 2010; Bleich, Jones-Smith, Jones, O'Hara, & Rutkow, 2016, and Donaldson, 2015), and variation in types of obesity policy across states (i.e.: school nutrition policy, sweetened beverage policy) (Lankford, Hardman, Dankmeyer, & Schmid, 2013).

Little research has been done, however, on the relationship between the stringency of obesity reducing policies and prevalence of obesity. Stringency is important because state governments may be passing policies that include more policy provisions aimed at lowering

obesity rates despite the generally low number of policies being introduced in response to its increasing obesity percentage. Additionally, although the policy design literature has extensively explored the stringency of concentrated animal feeding operations (CAFOs) (Koski, 2007a, 2007b) and renewable portfolio standards as a form of renewable energy (Yin & Powers, 2009; Carley & Miller, 2012), few studies have applied policy design formulation and the stringency of policy to health related problems. The purpose of this study is to fill the gap in the literature that currently exists by examining whether the number and stringency of state obesity policies have increased, decreased, or remained the same as state obesity rates have increased over time. Determining whether or not certain states have changed how they respond to the increasing prevalence of obesity will enhance understanding of policy design at the state level and its utility in curbing health crises. Because this dissertation is the first to apply changes in state policy stringency to obesity, this dissertation could potentially provide a guideline for state legislatures trying to reduce obesity rates through policy.

Research Question

Although rising obesity rates have led to an increase in research regarding obesity and state-level policy, current studies focus primarily on determinants increasing the likelihood that states will enact obesity reducing policies, factors influencing the prevalence of obesity reducing policies passed in a state, and analysis of variation in the types of obesity policy being enacted across states (Niggel et al., 2013; Cawley & Liu, 2008; Dodson et al., 2009; Lankford et al. 2013). There remains a gap in the literature that, if filled, would explain whether or not state obesity policy designs become more prescriptive as states experience an increase in obesity prevalence, reflected in more stringent obesity-related policies. Research is also needed to

determine why obesity policy stringency varies between states. Therefore, the number of enacted state obesity policies will primarily be used in this dissertation as an indicator of policy action or inaction within a state and four classifications of stringency are used to analyze policy over time and across states.

This dissertation has two main research questions. First, has state obesity policy design, as reflected by obesity policy stringency, changed in prescriptiveness as state obesity prevalence increased? Secondly, what factors contribute to variation in the stringency of state obesity policies?

Significance & Contribution of the Study

Howlett & Lejano (2012) argue that the field of public administration has largely ignored policy design research in recent years, making the connection of obesity policy stringency to policy design an important advancement of the literature. Additionally, until recently most policy design studies have focused on federal policies, but this study adds to the growing number of research focusing on state policy actions (Gerber, Maestas, & Dometrius, 2005; Kim & Gerber, 2005; Huber, Shipman, & Pfahler, 2011). Examining obesity policy stringency at the state level within the field of policy design is appropriate due to obesity's complex and multifactorial nature, which makes it difficult to combat. Researchers, health professionals, and government officials are trying to better understand the causes of obesity and find innovative ways to lower obesity rates. Therefore, examining changes in state obesity policy stringency is critical for the advancement of policy design research because stringency provides insight to whether or not policymakers tailor legislation to better confront health crises as they worsen. Additionally, analysis of obesity policy stringency has not been done in the context of state policy design and

therefore this study provides a new setting to the work of Koski (2007a), Yin and Powers (2010), and Carley and Miller (2012).

Studying the effectiveness of obesity reducing policy through analysis of content and language, not only adds to the policy design literature but also expands upon existing state health policy stringency research that analyzes variation in state policy stringency for other health topics such as sex offender legislation and child safety laws (Mancini, Barnes, & Mears, 2011; Bae, Anderson, Silver, & Macinko, 2013). Analysis of obesity policy stringency has slowly become of a topic of research, but provides no real insight into why some states increase the stringency of their obesity policies while others do not (Chan, 2013; Masse et al., 2013; Taber et al., 2012; and Lankford et al. (2013).

Lastly, this dissertation provides a new classification of state policy stringency that identifies if and how the stringency of obesity policy has changed within a state. A unique categorical system has been developed for this study as existing categorical systems do not include necessary explanations of the impact increasing obesity prevalence has on the stringency of state obesity policy. Existing categorical systems also fail to analyze what factors lead to variation in state policy stringency among states (Chan, 2013). This new classification of state policy also adds a qualitative measure of stringency to the policy design field, which has largely relied on quantitative measures of policy stringency (Koski, 2007a,b; Yin & Powers, 2012; Carley & Miller, 2012).

Methods

To determine whether or not the obesity-related policies of states remained unchanged, increased, or decreased in number and stringency between 2001 and 2015, this dissertation will

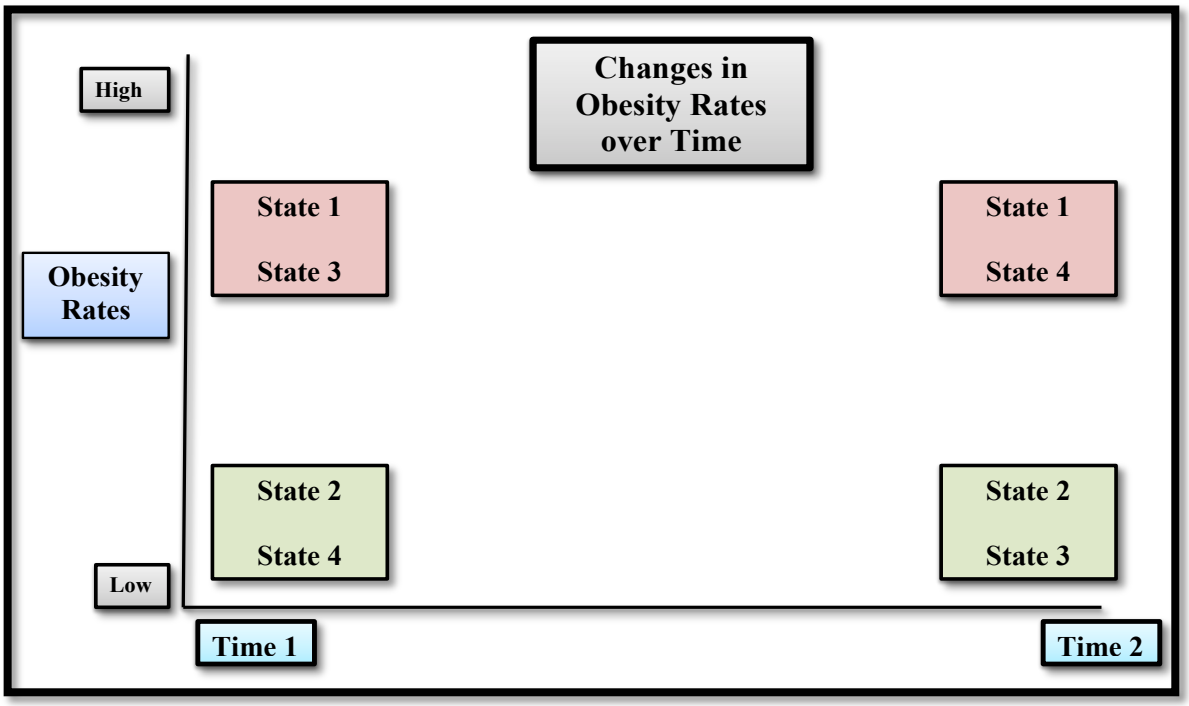
use a multiple case study design and compare the number and stringency of obesity-reducing legislation enacted in four designated states. Data for the comparison are extracted from the State Legislative and Regulatory Action to Prevent Obesity and Improve Nutrition and Physical Activity (SLRA) online database, which is maintained by the Center for Disease Control's (CDC) Division of Nutrition, Physical Activity, and Obesity (DNPAO). This database tracks nutrition, physical activity, and obesity prevention policies that are introduced, enacted, and vetoed at the state level. Legislation from the database is then analyzed and sorted into categories based on stringency to identify if state government responsiveness, in terms of prescriptive policy design, varies among states. Then, the states' variation in stringency of obesity legislation is analyzed to determine factors that may account for such variation.

Qualitative research is appropriate for this dissertation due to the importance of context. Quantitative research methods fail to account for individual characteristics that may influence state enactment of obesity-reducing policies (Hays & Sing, 2012). A qualitative multiple case study research design is chosen in its place because it fits the constraints of this dissertation; it provides insight into state-level dynamics by revealing the context in which decisions were made (Schramm, 1971). Multiple case studies allow a comparison between cases that provides an opportunity to corroborate, qualify, or determine a result that may not be found in a single case (Theiler, 2012). The use of multiple case studies highlights another positive aspect of qualitative research: it allows the researcher to present the cases holistically, making them more easily compared and contrasted (Hays & Singh, 2012).

For the aforementioned reasons, obesity policies of four states are analyzed to assess variation in the number and stringency of policies over time. As shown in Figure 1, the goal of selecting four states is to identify one state with consistently high obesity rates, one with

consistently low obesity rates, one that experienced improving obesity rates, and one that experienced worsening obesity rates. These four categories were chosen in order to explore how states with differing experiences with obesity prevalence adjust policy stringency as they respond to obesity. States have been chosen through simple descriptive statistics, specifically mean and standard deviation, which will determine what states best fits each category. Focusing on four states provides a manageable number of policies to analyze.

Figure 1. Changes in Obesity Rates over Time



Data Analysis Overview. Once the four state case studies have been determined, the search parameters, all enacted policies related to obesity, physical activity, and nutrition between 2001 and 2015, are submitted into the State Legislative and Regulatory Action database. The database then sorts policies by state and policy type, revealing the number of policies passed for each year between 2001 and 2015. Next, state-by-state, all obesity-related policies are divided by

year, analyzed, and classified by stringency into one of four categories as outlined in the methodology chapter. Once the policy stringency of each state has been analyzed individually, the policy stringency for all four states are analyzed holistically and compared.

The expectation is that trends within states will reveal variation among states in the number and stringency of state obesity policy. For example, one state might have increased the number of policies they passed, but not the stringency of the policy. This could be the case in states that categorize agriculture bills as a nutrition policy, but obesity reduction is not within the intended scope of the policy. Alternatively, another state might have passed fewer policies, but increased the stringency of enacted policies over time. For example, in 2010, a state may have enacted few obesity reducing policies, but the few policies all focused on improving school nutrition and reducing childhood obesity. The policy analysis will detail whether or not state obesity policy stringency increased, decreased, or made no changes, as well as whether or not variation in policy stringency exists between states.

Research Propositions

P_1: Casual state policy design addressing the obesity epidemic will be reflected in a consistently high prevalence of obesity and lack of change in obesity-policy number over time.

P_2: Stringent state policy design addressing the obesity epidemic will be reflected in a consistent number of obesity-related policies and low prevalence of obesity over time.

P_3: A state with policy designs increasing in stringency will experience decreasing obesity prevalence over time.

P_4: A state with policy designs decreasing in stringency will experience increases in obesity prevalence over time.

P_5: A state with a consistently high prevalence of obesity will have obesity-related policies with low levels of stringency.

P_6: A state with a consistently low prevalence of obesity will have highly stringent obesity-related policies

P_7: Affluent states will have more stringent obesity-related policy designs, reflected in a lower prevalence of obesity.

P_8: States with strong health interest group influences will have more stringent obesity-related policy designs, reflected in a lower prevalence of obesity.

P_9: States with a Democratic governor will have more stringent obesity-related policy designs, reflected in a lower prevalence of obesity.

P_{10}: States with Democratic control of the state legislature will have more stringent obesity related policy designs, reflected in a lower prevalence of obesity.

P_{11}: States where obesity-related policies have been predominately sponsored by Democrats will have more stringent obesity-related policy designs, reflected in a lower prevalence of obesity.

Organization of the Study

The next chapter provides a comprehensive review of the literature, which includes a theoretical overview of policy design, a review of state policy stringency literature, and a detailed review of the research propositions. Chapter three offers a detailed overview of the research methods as well as information regarding data sources and case study selection. Chapter

four consists of findings of data analysis, and chapter five provides a conclusion and explains the dissertation's implications for obesity policy as well as plans for future research.

CHAPTER TWO

LITERATURE REVIEW

This dissertation's literature review will fulfill three purposes: explaining policy design, identifying gaps in existing policy design stringency literature, and justifying the importance of policy design in the context of obesity policy and its stringency (Hays & Singh, 2012). The literature review's organization is intended to facilitate these purposes by inspecting existing areas of policy design literature, the application of policy design to policy stringency studies, and how policy design could and should be applied to health policy stringency studies, specifically the topic of obesity. The literature review also introduces literature detailing existing research on obesity policy determinants and prevalence in order to explain why more research on obesity policy stringency is needed, followed by the research propositions. A chapter conclusion will complete the literature review, by which time, state obesity policy stringency should be fully explained and justification for this topic thoroughly presented.

Policy Design Theory

When attempting to overcome problems of social behavior governments typically rely on public policies. For much of their existence, governments have created policy without the use of expert knowledge of the policy problem. Although knowledge has been increasing in certain policy areas like education and crime, a disconnect between government intervention and policies that most efficiently and effectively address policy problems remain (Linder & Peters, 1984). For this reason, individuals charged with the responsibility of creating complex policies have turned to policy design, an area of study shaped by taking pieces of design science and applying the concepts to social problems (Linders & Peters, 1984). Policy design has become a

critical component of ameliorating social problems through policy formulation, development, and modification to ensure that policies effectively address policy problems by changing social behaviors (Dryzek, 1983; May, 1991).

Policy design is a broad field of study and many different avenues of exploration can be taken to explain and analyze existing policy design research, justification for policy design content, and well as the impact of policy design on specific target groups and members of society (Bobrow & Dryzek, 1987). Overall, the different areas of policy design can be broken down into three fields: socially constructed target groups, implementation and the use of policy tools in implementation, and the formulation of policy design. Socially constructed target groups and implementation are often tied together as researchers explore which policy instruments work best on what target groups, as well as the burdens and benefits that previously implemented policies have had on target groups (Howlett, 2009; Schneider & Ingram, 1990). The third area of policy design, formulation, emphasizes the influences that impact the construction of policy design and therefore its content. Competing interests are frequently present when policy design is being decided upon and can lead to variation in policy design, even among similar government entities (Dryzek, 1983). Due to this dissertation's primary focus on influences that impact the stringency of policies design aimed at reducing a social problem, formulation will drive the discussion on policy design.

Two different strands of literature exist to explain how policy design is influenced and shaped (May, 1991). The first strand recognizes constraints that policy architects must take into consideration and plan around when constructing a policy design. The second strand focuses on the political factors that explain why certain policy decisions were made and how they were influenced (May, 1991). To remain consistent with the reasoning behind focusing on

formulation, this study focuses on the second strand in an attempt to explain why some state policy designs vary in stringency. Variation in policy design is often influenced by the political context in which the design is created and must be taken into consideration (May, 1991). Political context is an important piece of policy design due to differing opinions on what constitutes a policy problem, as well as different ideas of how to approach the policy problem. Competing interests can exacerbate the differing opinions and lead to variation in policy designs for a single issue (Stone, 1989; May, 1991).

Different viewpoints on a policy stance can mean the difference between policy design success and failure (Koski, 2007a; Stone, 1989). If created deliberately, policy design can be formed as an ideal configuration of policy elements that can be applied to a specific context leading to a positive outcome (May, 1991). Effective policy design can lead to the identification of target groups in need of regulation and create programs that direct state efforts to benefit people in need (Ingraham, 1987; Linders & Peters, 1987; Lowi, 1979; & Schneider & Ingram, 1997). The strong support of a specific policy design by its architects is evident in the language and mandates included within the policy and will determine whether the policy is meaningful and leads to change or is simply symbolic (Koski, 2007a). Policy design created in a political context that does not support or deem important the proposed change in social behavior will most likely fail or exist ineffectively. Policy designs of this nature may include casual and non-prescriptive language or fail to include incentives for target groups to change their behavior (Koski, 2007a; Schneider and Ingram, 1997).

Policy Design Stringency

Policy design stringency is becoming an increasingly important component of the policy design literature due to its ability to measure how well policy designs address a particular topic. For the purpose of this dissertation, policy design stringency is measured by the strictness or harshness of its content (Koski, 2007a, 2007b). Focusing on influences that determine policy stringency helps explain why some states take a seemingly stronger approach to social problems than others. Researchers have addressed policy stringency as part of policy design in order to identify why variation across states exist.

Koski (2007a) explores policy stringency by applying regulation stringency to policy design in the context of animal feeding operations (AFOs), specifically concentrated animal feeding operations (CAFOs). Animal feeding operations are confined agricultural areas where animals are placed. Rather than roaming for food such as grass, food is supplied to the animals (Koski, 2007a). Concentrated animal feeding operations make up a small number of AFOs subject to regulation by the Environmental Protection Agency (EPA). The EPA regulates CAFOs because they emit air pollution similar to those of a large manufacturing plant and have also been linked to ground and surface water pollution (Koski, 2007a). Despite the government interest in regulating CAFOs, states may petition to regulate their own national pollutant discharge elimination systems (NPDES). States granted the right to regulate their NPDES's typically adopt CAFO regulations into their own statutes and administrative codes. States then often create a general permit program for CAFOs that meet the EPA standards (Koski, 2007a). Variation in policy design occurs when states add regulations to the baseline requirements mandated by the federal NPDES program. For example, states may add additional size criteria or include protection for certain geographical areas.

State CAFOs policy directives vary considerably, ranging from less than a paragraph to over 100 pages (Koski, 2007a). In order to analyze variation, Koski (2007a) assigned CAFO provisions to one of 12 categories: certified nutrient management plan, design, waste application, facility closure, financial assurance, permit, permit application, groundwater, odor, public notice, record keeping, and annual reporting. Next, Koski (2007a) created six variables to measure stringency, scope, and prescription with two variables measuring each design dimension. Scope was used to account for the number of activities addressed by administration as well as the CAFO actions that would need to be regulated by the state. Stringency was calculated by counting the number of design requirements and setback distances, and the length of the CAFO policy goal statements determined prescription. States were then clustered into one of three groups; strong: high prescription, scope, and stringency; moderate: some combination of two low and one moderate dimension; and weak: low prescription, scope and stringency (Koski, 2007a). The findings indicated that variation did exist among states although there were distinct differences between states belonging to the strong and weak categories. Overall most states included a variety of regulatory strategies. For example, some states emphasized policies that were more stringent but less prescriptive.

In a follow-up study, Koski (2007b) once again applies policy design to CAFOs, but this time explores the characteristics that influence regulator provisions. Koski (2007b) analyzes state interest group pressure, institutional constraints, and political ideology to determine how they impact variation in the stringency, scope, and prescription of CAFO regulations. Koski (2007b) chose to analyze interest group pressures due to the relationship between political principles, political influence, and political expertise (Woods, 2005; Waterman, Rouse, & Wright, 1998). Due to their role as chief administrators of bureaucracy, governors were selected to measure

institutional constraints (Abney & Lauth, 1983). Similarly, Koski (2007) included political parties due to their influence over the scope of policy designs. Another area of focus by Koski (2007) included the economic status of a state due to the fact that wealthier states are more likely to focus on social regulatory issues like labor practices and economic impacts (Dye, 1966; Kraft, 2000). Lastly, Koski (2007), analyzed the extent of the CAFO pollution problem in each state, hypothesizing that states experiencing more problems with CAFO pollution would contribute more resources towards regulating CAFOs (Feiock & West, 1993).

With these areas of analysis in mind, Koski (2007b) developed a rating scheme for scope, stringency, and prescription. Utilizing multiple regression models Koski (2007b) tested the relationship between the areas of analysis and the dimensions of regulatory design. Using ordinary least square regressions (OLS), Koski (2007b) determined that stringency, scope and prescriptions were influenced by different actors. For example, interest groups influence the stringency of CAFO policies, but not the scope of prescription. Governors also influenced the stringency of regulations, but to a lesser extent than interest groups; the strength of the governor also affected the prescription of CAFO policies. Wealth influenced the stringency of CAFO policies, as poorer states were more likely to have weak CAFO policies. The findings also indicated that political parties influenced the scope of regulations, and although the extent of the pollution problem did not lead to more stringent policies, it did lead to more prescriptive policies (Koski, 2007b).

Yin and Powers (2010) apply policy design to renewable portfolio standards (RPS) as a means to reduce carbon dioxide emissions from power plants. As of April 2009, 30 states plus the District of Columbia had some form of renewable energy policy in place. For the most part all states shared a few key features, but many policy components varied widely from state to

state. Yin and Powers (2010) argued that previous studies analyzing RPS policy failed to account for heterogeneity in polices, and therefore may have provided misleading findings. To test this theory, Yin and Powers (2010) constructed a new variable measuring RPS stringency to more accurately determine the strength of the renewable energy policies, which they referred to as the incremental requirement. This variable takes into account the RPS policy requirements by state and year, the proportion of utility sales by state and year, all retail sales in each state by year, the amount of renewable generation needed to meet RPS requirements, and the date that RPS legislation is enacted (Yin and Powers, 2010). Using the new variable to analyze data, Yin and Powers (2010) determined that RPS policies significantly increase the likelihood that states will develop renewable electricity. Previous studies had also indicated that well-designed RPS policies should apply equally to all load-serving entities in a state, but Yin and Powers (2010) determined that variation in mandated coverage compliance existed among utilities, specifically investor-owned utilities, power marketers, rural cooperatives, and municipal cooperatives.

In exploring the strength of RPS policies with the new variable, Yin and Powers (2010) found that some policies previously deemed aggressive, offered only weak incentives and other policies categorized as moderate were now considered to be highly ambitious. Yin and Powers (2010) also looked at other factors influencing RPS policies including state income, presence of conservation cautious voters, and policy diffusion from neighboring states. The findings determined that states with higher incomes were more likely to have stringent policies regarding renewable energy sources because they could afford the possibility of higher energy costs. States with a high environmental preference, as noted by conservation cautious voters, were more likely to support renewable energy and have more stringent policies, but states did not make decisions on renewable energy policy stringency based on the RPS policy decisions of neighboring states.

Lastly, using their new measurement of stringency, Yin and Powers (2010) looked at the impact of RPS on the renewable electricity development in a state and found that RPS policies had a positive impact on the development of renewable electricity.

Carley and Miller (2012) also explored renewable energy, in terms of RPS policies, by focusing on variation resulting from a lack of federal regulation. Although there are mandates that dictate a certain percentage contribution to the national electric load from each states' total electricity production, RPS policy stringency varies by state (Wiser & Barbose, 2008). Most state policy variation occurs due to different guidelines pertaining to the amount of energy that must be contributed, the dates when the contributions must occur, and an overall lack of standardization of policy design requirements among states (Carley & Miller, 2012). To test for policy design variation, Carley and Miller (2012) created a new method for measuring stringency that allows for comparison of RPS policies among states, and can also be used to predict policy adoption. Carley and Miller (2012) also explored characteristics found to be significant indicators of state energy policy enactment: state-level political ideology, in terms of both citizen preferences and partisan legislative control (Chandler, 2009; Lyon & Yin, 2010; Mattisoff, 2008; Stoutenborough & Beverlin, 2008), state affluence measured through total gross state product (GSP) (Huang, Alavalapati, Carter, & Langhotz, 2007), and influence of interest groups.

Carley and Miller (2012) used two steps to identify factors that led to stringency variation in RPS policies. First, the authors made RPS adoption a binary variable, indicating that variables either were adopted or they were not. Next, the authors separated policies into one of four categories according to stringency: no RPS, a voluntary RPS, a weak RPS, or a strong RPS. A logit model was then used to measure the probability that RPS policies would be adopted each year while controlling for political and socioeconomic variables. After calculating for stringency

the findings indicated that citizen ideology influenced whether or not a state would adopt RPS policies, states that were considered liberal had the most stringent RPS policies, state affluence as measured by GSP did not influence RPS policy stringency, and interest groups did not influence the stringency of RPS policies.

Policy Design Stringency and Health Policy Problems

In terms of changing social behaviors, government may have no greater challenge than overcoming health policy problems. Healthcare policy relates to problems burdening state governments, like obesity and smoking. Despite the important policy design implications associated with health policies, few formulation policy design studies have taken on health-related topics. Many of the health problems researched in the area of policy design pertain to policy design implementation and the impact of implemented policies on socially constructed groups (Hogan, 1997; Huddleston, 2006; and Basak & Raphael, 2006). Glasgow, Boles, Lichenstein, and Stryker (1996) took a small step towards incorporating health into policy design stringency by creating a method to classify tobacco policies by stringency.

Responding to a new acceptance of health promotion aimed at making social and environmental changes, Glasgow et al. (1996), explore efforts to reduce smoking among young adults, strengthen existing smoking control policies, as well as efforts to create a reliable and valid way to classify the strength of tobacco policies. After realizing that there was no satisfactory way to classify and quantifiably measure the smoking policies of organizations, Glasgow et al. (1996) began creating an instrument that would standardize written tobacco policies. The instrument was first applied to policies set by Indian tribal councils and worksite policies of organizations participating in worksite-based health promotions. These two settings

were selected because the data had already been collected as part of larger projects focusing on these two areas.

As part of developing the measurement instrument, a one-page form was created to rate the strength and extensiveness of written tobacco policies. The goal was to provide a reliable and standardized measure of tobacco policies in either of the two settings. On the form, tobacco policy was broken down into five dimensions: rationale for policy, indoor restrictions, enforcement, availability of cigarettes, and cessation resources. In the category explaining rationale for policy, raters indicated whether the policies explicitly mentioned the health consequences of tobacco or the hazards associated with tobacco smoke. The indoor restrictions category differentiated between smoking tobacco and chewing tobacco, and any penalties for non-compliance were scored in the enforcement category. The availability of cigarettes included ratings for cigarette vending machine limitation and statements regarding the importance of limiting child exposure to cigarettes. Lastly, any statements about smokers were rated in the cessation resources category (Glasgow et al., 1996). Scores on the form ranged from 0 to 14; numbers closer to 14 reflected more comprehensive policies. Smoking policies of the Indian tribal councils and worksite policies of organizations varied in stringency with policies ranging from one-paragraph memoranda to resolutions of three pages (Glasgow et al., 1996).

Although the study on tobacco stringency does not expand into characteristics that influence policy, it is a first step in including health policy problems into the discussion of policy design stringency.

Policy Design and Obesity

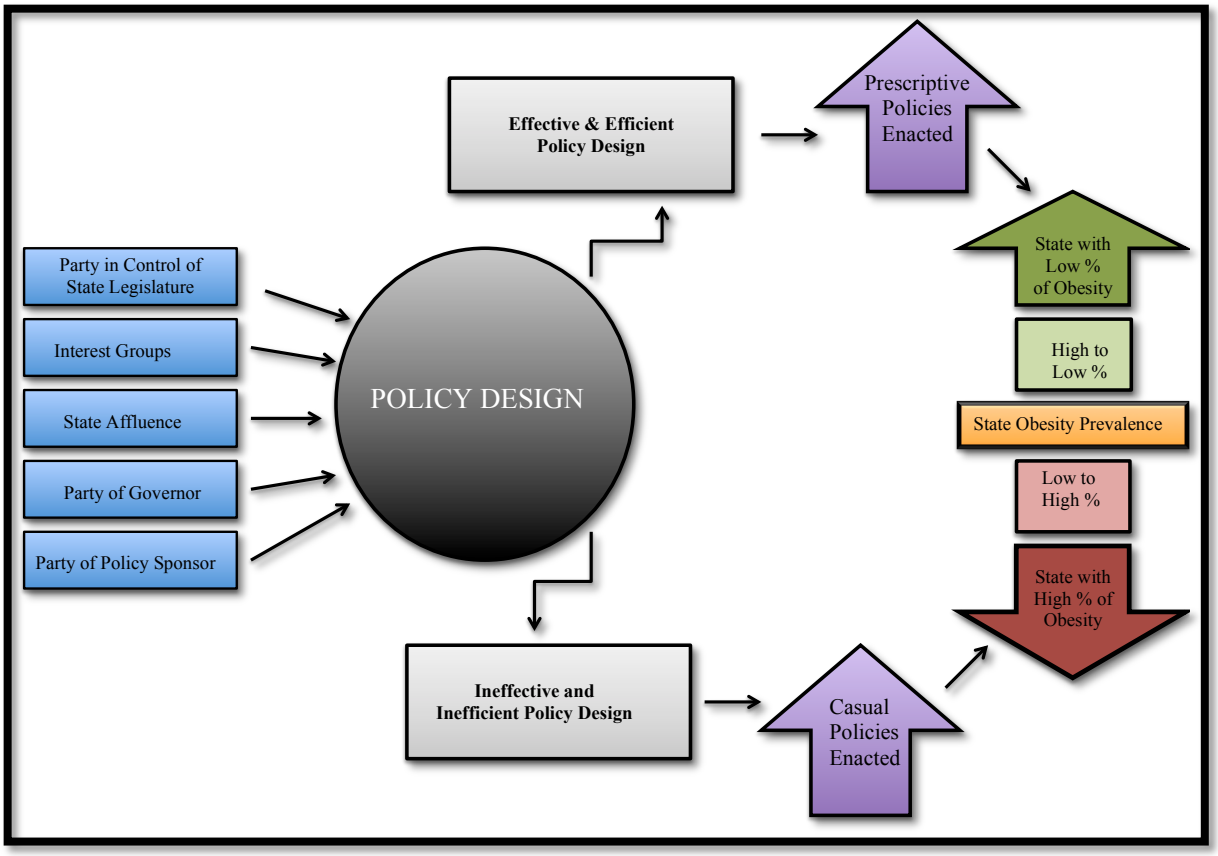
Obesity is becoming a significant problem for state governments. Whereas some states are taking the policy lessons they learned from battling health crises like tobacco and applying them to obesity, other states have avoided taking significant obesity policy steps (Johnston, Matteson, & Finegood, 2014). It remains unclear why variation in state obesity policy stringency exists. Policy design is an appropriate means to study state obesity policy stringency due to the government-led interventions required to alter the social behavior causing individuals to become obese. Using policy design to analyze the relationship between policy designs and state obesity policy stringency is beneficial for three reasons. First, it expands upon literature focusing on the influence of political context on policy designs (May, 1991). Secondly, studying obesity will help identify whether the characteristics influencing policy design in the research of Koski (2007a, 2007b), Yin and Powers, (2010), and Carley and Miller (2012) also applies to the stringency of obesity policy design. Lastly, this study continues the work started by Glasgow et al. (1996), which applied policy design stringency to a health-related problem facing the government.

Policy Design and Obesity Policy Stringency Conceptual Framework

The conceptual framework of this policy, as shown in Figure 2, illustrates the influences that may determine whether a policy design is effective or ineffective. Interest groups, state affluence, party of governor, party in control of the state legislature, and party of policy sponsor have the ability to manifest themselves into constraints and political pressures that impact the decisions of the policy design architect (Koski, 2007ab; Yin & Powers, 2009; & Carley & Miller, 2012). For this reason these five influences will be analyzed to determine if they influence policy

design in each state, causing variation in obesity policy stringency across each of the case studies. The strength of the five influences listed may determine if the policy design is effective and efficient or ineffective and inefficient (Koski, 2007a). If the obesity policy design falls into the category of effective and efficient it is expected that this will be reflected in more stringent obesity related policies leading to lower levels of state obesity prevalence, or decreasing levels of obesity. States creating ineffective and inefficient obesity-related policy design are expected to have more casual policies reflected in high prevalence's of state obesity, and worsening state obesity prevalence.

Figure 2. Policy Design and Obesity Policy Stringency Conceptual Framework



Importance of State Obesity Policy

As with many public health crises, the individual consequences of obesity have become a health and financial burden for state governments. Obesity is responsible for a 27% increase in inflation-adjusted state government spending since 2001, which, depending on the state, is signified by state obesity-related medical expenditures ranging from $87 million to $7.7 billion (Pomeranz, 2011). Medicare and Medicaid cover roughly half this cost, which has increased Medicare spending for obesity-related matters from 6% to 20%, on average, per state. Medicaid has also increased substantially, increasing from 5.2% to 10.2% at the state level (Werman & Harris, 2014). The steady increase in healthcare expenditures represents only one of many financial burdens obesity places upon states. For example, states with higher obesity rates are perceived to have an unhealthy workforce, resulting in the increased likelihood of high health costs and lost productivity. As a result, these areas are considered unattractive to business owners and investors, creating reluctance for large businesses to move to these areas. States able to reduce obesity rates would make themselves more attractive to companies looking to relocate or expand their businesses (Trust for America's Health, 2010). The evolution of obesity consequences from an individual to a social problem has led to increased demands for policy action, a departure from the lack of urgency to respond to increasing obesity rates over the last thirty years (Smith, 2009).

State Policy Action. Public health concerns often receive strong support from the federal government, but federal policies pertaining to obesity have been critiqued for lacking effectiveness. The government recently implemented a wide range of policies and programs designed to develop national clinical guidelines, add nutrition labels to packaged foods, increase education and social marketing efforts, and display calorie labels of foods on restaurant menus.

Critics argue, however, that these policies focus too much on clinical and educational factors of community intervention and largely ignore the environmental drivers of obesity (Schroff et al., 2011; Novak & Brownell, 2012). These claims seem to hold validity, as an analysis of federal obesity policies illustrated that in 2009, the 111th United States Congress failed to introduce or enact any bills that would effectively target obesity (Ferguson, Downey, Kornblet, Lopez, & Muldoon, 2009). In the absence of effective intervention at the federal level, states have taken on the responsibility of proposing, enacting, and enforcing obesity policies designed to increase physical activity and improve the nutrition of state residents (Jones, 2010).

States that prioritize obesity legislation have succeeded in making effective changes due to the expansive nature of state authority, which allows state legislatures to intervene when residents are making unhealthy decisions. Most states employ police power to coerce human behavior, as it provides a legal avenue to positive change if the policing is done in the interest of protecting the health, safety, and welfare of the public. Often, police power is executed in the form of collaborative efforts with local agencies by prioritizing programs that make nutrition services more accessible and physical activity safer. Examples of this cooperation include nutrition policy implementation, park and recreation department establishment, and planning and transportation boards' utilization (Mermin & Graff, 2009; Koplan, Liverman, & Kraak, 2005; Gostin, 2001; Dodson et al., 2009). For long-term success beyond the restrictions of police power, states must be innovative and aggressive in terms of how they address increasing obesity prevalence (Salinksy & Scott, 2003). In 1932, Justice Brandeis advocated for state level policies because states, "provide a natural laboratory for testing innovative policies" that is unavailable at the federal level (Reeve, Ashe, Farias, & Gostin, 2015, p. 442).

State policy actions can manifest in one of four policy approaches: laissez-faire, submerged policymaking, psychological state action, or positive state action (Kersh, 2015). The laissez-faire perspective argues that states should limit their action to providing nutritional education and encouraging exercise, which places the onus on the individual to lose weight without overextending the role of the state. In a submerged policymaking system, tax and budgetary laws provide incentives to encourage state residents to adopt desired behaviors. Psychological state action is also referred to as a 'nudgeocracy' because it encourages using behavioral tools that promote specific behaviors. Lastly, the positive action approach aims to transform how individuals think of obesity; rather than accepting it is a personal responsibility, adherents to this approach allow government to assume responsibility and provide intervention.

Positive action is ideal because the change resulting from this action has the greatest impact of the four approaches. This policy approach has worked successfully in the United Kingdom, Scandinavian countries, and Mexico, where banning junk food advertisements and support of junk food taxes have been supported. Positive action is difficult to achieve at the state and federal levels because its acceptance depends on the cooperation of diverse stakeholders, such as government and industry. The positive action approach will only work if it has the support of national and local governments, retailers, consumer-goods companies, restaurants, employers, media organizations, educators, healthcare providers and individuals must all work together towards the common goal of reducing obesity rates in order for there to be the cultural shift. For these reasons it would be difficult for the positive action approach to work in the current political environment of the United States as reflected by the inaction of the 111th Congress regarding obesity reduction policies (Kersh, 2015; Ferguson et al., 2009).

The ability for states to be creative and innovative, interpret federal law uniquely, and pursue varying policy action approaches has led to variation among state obesity policy that is reflected in the number, stringency, and topics of policies introduced and enacted. This disparity is further exacerbated by the varying strength of state agencies, like the departments of health and education, that have differing ideas on the best way to provide food assistance, obesity and nutrition education, funding to combat obesity, and perform community outreach, which is reflected by different policy design approaches (Koplan et. al., 2005; Harvard School of Public Health, 2016b).

Due to the complex social nature of obesity, no single policy initiative provides a comprehensive solution to the epidemic; mixed and blended combinations of the policy approaches exist in an attempt to reduce obesity while keeping constituents happy. When faced with decisions on how to successfully reduce obesity rates, the most cost-effective interventions at the state level have been identified as a reduction of unhealthy marketing to children and taxation of sweetened beverages (Novak & Brownell, 2012).

Limited Food and Beverage Advertising for Children. The amount of television that Americans watch per week has increased over the past six decades. In 1950, only two percent of households had television sets, yet by the early 1990s, nearly 98% of households had televisions and 60% had cable television (Hurt, Kulisek, Buchanan, & McClaves, 2010). In 2004, 60% of American children had a television in their room, which accounted for one additional hour of television viewing per day. Twenty-five percent of those children were between the age of one week old and two years old (Hurt et al., 2010). The increase in exposure to televisions has resulted in heighted susceptibility to messages in television commercials, and the food industry

purposefully invests large quantities of money into this medium to attract customers, especially kids under the age of 18.

In 2006, The Institute of Medicine released the report *Food Marketing to Child and Youth: Threat or Opportunity*, which revealed a link between food advertising and childhood obesity (Chou, Rashad, & Grossman, 2008). Prompted by an awareness of such linkages, in 2007, the Federal Trade Commission required forty-four food and beverage companies to reveal their child marketing practices. The Commission found that, on average, companies spent $870 million in advertising food and beverages to children, $1 billion to adolescents, and $300 million to both groups simultaneously (McGinnis, Gootman, and Kraak, 2006). Humans are highly receptive to subtle environmental cues and, therefore, are easily influenced by marketing that entails food accessibility, pricing, portion increases, and variety (Brownell et al., 2010). Advertising reveals itself in almost every medium associated with citizens' daily lives: television, radio, print, media, internet, and advergames, a term used to describe food advertising within video games (Hawkes, 2007). Because some students may not have access to television or computers at home, the food industry has taken advantage of marketing at schools because most students attend them. Soda companies donate to schools and establish pouring right contracts to monopolize on the fact that many school districts consistently budget for soda vending machines. As of 2000, almost 200 school districts were engaged in some type of pouring rights contract (Mortazavi, 2011).

Due to the negative influences that food advertising can have on children, state governments have started pushing back against this type of advertising and are establishing programs to educate consumers on food choices. Making policy to limit advertising to children is difficult, however, due to the Supreme Court Case *Virginia State Board of Pharmacy v. Virginia*

Citizens Consumer Council, which has led to the protection of commercial speech doctrine, applying the First Amendment to advertising rights. False or misleading advertising is exempt from First Amendment protection, however, because it serves no informational purpose (Harris & Graff, 2012). As obesity rates continuously increase, states are pushing the boundaries set in the *Virginia Pharmacy* case. States have little authority to limit national media, but can regulate the promotion and sales of food within their boundaries. States are allowed to limit advertising at schools, which is why most state advertising laws pertain to elementary school legislation (Masse, Perna, Agurs-Collins, & Chriqui, 2013). Developing prescriptive policy design with stringent content is an important component to overcoming the protection of the commercial speech doctrine to limit food advertising and promotion to children.

Taxes on sweetened beverages. Sweetened beverages are an increasingly precarious component of the American diet, adding an average of 278 calories to diets daily. The number of people drinking these beverages is rising, indicated by an 135% increase between 1977 and 2001 (Hurt et al., 2010). Every day, nearly one half of Americans have at least one sweetened beverage, 25% have 200 calories worth of sweetened beverages, and 5% consume an average of 567 calories derived from sweetened beverages daily, the equivalent of four sodas (Dietary Guidelines for Americans, 2010). Between 2005 and 2006, it was estimated that soda accounted for one-third of the beverages children consumed, exceeding any other beverage (Dietary Guidelines, 2010). Sweetened drinks are an unhealthy dietary addition, and each drink increases the risk of obesity by 1.6%. Some individuals attempt to balance their diets by replacing food with sugary drinks, but fail to realize that the body does not process liquid calories in the same manner as solid foods. As a result, individuals may actually increase their food consumption when they become hungry (Ludwig, Peterson & Gortmaker, 2001).

Evidence of the negative impact sweetened beverages have on individuals' health has led policymakers to contemplate the application of sumptuary taxes to the product; such policies are designed to decrease consumption of a product for various reasons, as in the case of tobacco and alcohol (Frieden, Dietz, and Collins, 2010). Soda taxes were designed to mimic the effect of tobacco taxes, where the added financial burden associated with the product, deterred individuals from buying it. Although states with soda taxes of five percent or higher were more likely to have stronger competitive beverage laws than states with soda taxes below five percent, state level taxes on soda were a more effective revenue source than behavior deterrent. In 2007, 28 states had sales taxes on soda that were higher than on any other type of food, but they did little to curb soda drinking in adolescents (Greathouse, Chriqui, Moser, Agurs-Collins and Perna, 2013; Sturm, Powell, Chriqui & Chaloupka, 2010).

Frieden et al. (2010) argues that if a tax of one cent per ounce on sweetened beverages, a 10% increase, were imposed the tax would be more effective in changing human behavior and decreasing sweetened beverage consumption. The tax could reduce individual consumption of sweetened beverages by 8,000 calories annually, which would prevent people from gaining 2.3 pounds on average. If this technique proved effective, states could utilize the same method to eliminate or reduce consumption of snack foods. It has been difficult to implement these types of taxes historically, however, due to resistance over government involvement in personal decisions (Frieden et al., 2010). Effective policy design may be a critical component of creating policy that successfully changes social behaviors, while not making citizens feel as though their personal freedoms are in jeopardy (Linder & Peters, 1988).

Personal Responsibility versus Environmental Defaults

Public interest in obesity has increased since the 1980s, and opinions regarding how the epidemic should be handled vary greatly (Smith, 2009). Despite a common understanding that obesity is a problem, not everyone agrees on who is responsible for its prevalence or how it should be remedied (Brownell et al., 2010). Public opinion exacerbates variation in how state legislatures respond to increasing obesity rates because residents influence state policies. For example, legislators are less likely to intervene if their constituents view obesity as a personal responsibility problem (Turner, O'Connor and Rademacher, 2009; Niderdeppe, Porticella, and Shapiro, 2012; Kim & Willis, 2009). Conflicts regarding state involvement are reflected in the differences between states' legislative action; some actively introduce and enact legislation aimed at reducing obesity rates, while others primarily create symbolic policy instruments designed to give the appearance of change, while not antagonizing the food industry (Niggel et al., 2013; Schroff et al., 2011). State responsiveness to obesity, evidenced by its adopted and enacted policies, typically results from one of two stances constituents hold on who is responsible for obesity: personal responsibility or environmental influences (Kersh & Morone, 2002).

Environmental Defaults. Individuals that view obesity as a problem of environmental influences typically welcome government involvement, taking the position that public health initiatives can only succeed if both individual and societal changes are made. For example, government techniques for advancing health in areas of sanitation, infectious disease, nutrition, and smoking were successful due to individual and community adherence to new policies (Vallgarda, 2015; Brownell et al., 2010). Obesity policies trying to improve environmental influences would be most effective if they targeted built environments. Built environments are

defined by a holistic view of the multi-faceted aspects an individual's life. The environment in which he/she lives, works, and plays are of special interest to policymakers because research has found that obsogenic factors in built environments are extremely influential in determining the likelihood an individual will become obese (Khan, 2011). Default environmental choices influence behavior, especially in terms of food selection, and the current nature of default food environments promotes behaviors that lead to obesity.

For example, children and adults can easily access calorie-dense foods that lack nutrients by visiting any supermarket, gas station, drug store, mall, or school with vending machines (Friedman & Schwartz, 2008). Moreover, individuals who live near fast food restaurants are more likely to frequent them than those who would have to travel to access fast food (Novak & Brownell, 2012). Built environments can be changed, however, to make healthy foods and physical activity more inviting and accessible, leading to healthier default choices. Healthier default environments may be achieved by limiting the number of fast food restaurants within walking distance to schools or putting healthy food restaurants in their place (Novak & Brown, 2012).

In its attempt to alleviate the negative consequences of the obesity epidemic, research has found that one of the most efficient ways to curb obesity rates is using policy intervention to transform existing environmental defaults into healthier options. Policy analysts maintain that the default options should be designed to incorporate all citizens, not just those that are obese, to integrate a preventative component into these types of obesity reducing policies. Obesity prevention policies altering food environment so people can easily make healthy choices are among the most popular type of obesity reducing legislation (Sacks, Swinburn, & Lawrence, 2009). While some focus of the legislation is altering available food choices, research suggests

that replacing a fast food restaurant with a gym is another way these policies could be implemented (Novak & Brownell, 2012).

The diversity of policies aimed at tackling built environments is evidenced in the array of achievements this form of legislation has made. In 2002, for example, the Institute of Medicine released a report noting some of their biggest health achievements of the 20th century. Some of these achievements included providing cleaner water, better access to food, milk sanitation, reduction of physical crowding, and central heat with cleaner fuels. In large part, these health achievements were successful because they did not require any actions by Americans; the healthier default conditions were simply put in place and made easily accessible (Khan, 2011). Adjusting default conditions to combat obesity is imperative to remedy individuals' unhealthy and unaware behavior; it is estimated that people remember less than 10% of their 200 daily food decisions, which include even minute choices such as finishing food on a plate despite portion size or food appearance. Individuals are vulnerable to environmental influences, and availability, marketing, and prices of food and beverages have an impact on decision-making.

Personal Responsibility. Opponents of government intervention reject the notion that government can dictate how people live their lives (Vallgarda, 2015). Individuals of this mindset typically believe that obesity is the result of irresponsible or weak behavior and that industry should not be held accountable for the behavior of individual citizens (Brownell et al., 2010). Food industry groups, free-market think tanks, and the popular press support these opinions and agree that state regulation is used to demonize the food industry through the promotion of a "nanny state" and an intrusion on personal freedoms (Herington, Dawson, & Draper, 2014; Brownell et al., 2010). Although many people become obese due to the products sold by the food industry, attempts to demonize the food industry have failed to gain momentum due to strong

political power held by the food industry and smart marketing that frames obesity as a personal responsibility (Brownell, 2010). Governments have a historical tendency to intervene in instances of public health emergency, and if obesity rates continue to increase, citizens may be forced to accept government regulation of competitive foods, increased taxes, and implementation of environmental defaults (Herington, Dawson, & Draper, 2014).

It remains unclear, however, if the public's perception of obesity will change, which may lead to a conflict between the government's obligation to respond and the citizens' objection to freedom-limiting intervention. A poll taken by Oliver (2006), revealed that many individuals do not react kindly to the theory that obesity may be influenced by genetics, favoring the opinion that genetics is an excuse, despite evidence that genetics is one of the top five reasons individuals become obese (Harvard School of Public Health, 2016a). As previously indicated, public opinion is important because residents' opinion is likely to influence state governments' actionable legislation. If constituents in a specific state view obesity as a personal responsibility problem, designing and enacting meaningful policy that treats obesity as an environmental problem may be an unrealistic approach to obesity by the legislator elected in that constituency (Turner et al., 2009; Niderdeppe et al., 2012; Kim & Willis, 2009).

There is no clear path to bridging the gap between those that support environmental defaults and those that believe obesity is an individual problem. If more individuals are able to see the value in environmental defaults, however, it may mean progress for the positive action approach to obesity, and opportunity to implement more obesity-reducing policies such as food and beverages taxes.

Determinants of State Obesity Policy

Currently, state obesity policy literature focuses on two main areas of state obesity policy: state determinants that influence the enactment of obesity related policies and prevalence of obesity legislation at the state level. The latter includes studies exploring variation in obesity policy topics across states such as school nutrition policy or sugary beverage policy. A third, less prominent area of study introduces literature touching upon state obesity policy stringency.

Boehmer et al. (2008) examined state policy that focused on childhood obesity prevention using a four-phase policy research framework that was originally developed to analyze physical activity policies. The four phases consisted of the identification of relevant policies, the identification of determinants of establishing policies, an analysis of the development and implementation of policy, and an examination of policy outcomes. To test this framework, Boehmer et al. (2008) used a legislative database created by NetScan's Health Policy Tracking Service (HPTS) to identify state legislation related to nutrition, activity, and obesity between 2003 and 2005. Between January 1, 2003 and December 31, 2005, one thousand bills meeting this criterion were analyzed.

Boehmer et al. (2008) sorted the bills using four criteria: non-duplicate policies, relevant obesity prevention topic areas, applicability to childhood obesity, and health impact. Independent of each other, four research team members coded bills for applicability and health impact. The final policy sample size included 717 bills that were introduced in 49 states. Next, Boehmer et al. (2008) constructed a two-level hierarchical logistic regression model for the purpose of identifying bill and state characteristics related to bill enactment. The study found that factors pertaining to the bill itself are more indicative of policy enactment than the characteristics of the state. For example, bill characteristics like whether they were introduced to the state senate with

multiple sponsors, amended existing law, addressed walking and biking trails, and focused on safe routes to school were more likely to result in the enactment of obesity-related policies than the presence of certain state-level socio-demographic or economic factors (Boehmer et al., 2008).

Eyler, Nguyen, Kong, Yan, and Brownson (2012) expanded upon the work of Boehmer et al. (2008), creating a content review for state policies pertaining to childhood obesity. They achieved this by identifying predictors that may indicate whether or a not a state would pass childhood obesity prevention legislation. The authors used the legislative database NetScan to identify 26 legislative topic areas from the literature. A search through NetScan was run for all 50 states for the years 2006, 2007, 2008 and 2009, resulting in 2,016 obesity-related bills for analysis. The researchers divided policies into one of two categories based on whether or not they were enacted; enacted bills were considered those that passed both chambers of the state legislature. To identify relevant bills and state-level characteristics that predicted state action, Eyler et al. (2012) adopted strategies of regression modeling introduced by Hosmer and Lemeshow. The authors found that legislatures with term-limits were more likely to take on the challenges of obesity legislation than those without term limits. Additionally, legislation that included safe routes to school were more likely to be enacted than other obesity-related topics, which could be a result of the national Safe Routes to School Program, administered through the U.S. Department of Transportation. Lastly, Eyler et al. (2012) found that neither childhood obesity rates nor adult obesity rates predicted obesity legislation enactment.

The purpose of Cawley and Liu's (2008) study is slightly different than Boehmer et al.'s (2008) and Eyler et al.'s (2012) research in that it seeks to identify factors that influence states to pursue goals set by the *Health People 2010* report and comply with recommendations from the

2005 Institute of Medicine's (IOM) report. The study also has a second objective: to analyze the impact of the 2006 election, one that gave Democrats control of 6 governorships and 5 state legislatures, on legislative action. Cawley and Liu (2008) analyzed information related to state policy action prior to the 2006 election and the potential for a state's socio-economic characteristics to influence the aggressiveness with which states approach childhood obesity. Using data on the introduction and enactment of childhood obesity related laws collected by Thomson West's Health Policy Tracking Service, Cawley and Liu (2008) focused on the end-of-the-year data for 2003, 2004, and 2005 and the 2006 April report, with 2003 being used as the reference year. The analysis specifically focused on bills that addressed physical education, school nutrition, BMI reporting by schools, and health education. Cawley and Liu (2008) ran probit regression models to test the association between state legislative action and state health, socio-economic, and political characteristics.

The findings indicated that states with Democratic governors were more supportive of raising taxes to implement policies recommended by the Institute of Medicine, helped meet goals outlined in the *Healthy People 2010* report, or policies focusing on school nutrition. Additionally, states with a higher percentage of adults who agree that obesity is a problem are more likely to support childhood obesity legislation. States with larger African-American populations are also more likely to enact policies aimed at reducing childhood obesity. Lastly, Cawley and Liu (2008) found that the 2006 election, and the increased power of the Democratic power, also led to increased policy action aimed at reducing obesity prevalence.

Marlow's (2014) study expanded on the work of Boehmer et al. (2008), Eyler et al. (2012), and Cawley and Liu (2008) to include both adult and childhood obesity prevention in an attempt to determine why some states are more likely than others to enact legislation addressing

obesity at all ages. Analyzing laws enacted in 30 states between 2001 and 2010, Marlow (2014) focused on laws in four categories: Taskforce, which create commissions to conduct studies; School, which legislate school-based strategies aimed at children; Community, which address communities at large; and Health Care, which relates to insurance, medical care, and health provider-based programs. Logit estimations were used to calculate the odds that a state would enact obesity-related legislation. Marlow (2014) found a weak negative correlation between state obesity prevalence and the number of passed policies. The results suggest that states that enact the most laws are those with relatively low obesity prevalence. Demographics also indicated the likelihood that a state would pass obesity-related policies; the number of obesity policies was heavily influenced by the state's educational attainment, percentage of African American and Hispanics, and age make-up. Politically, states with Democratic governors and Democratic control of the lower legislative houses were a solid indicator of state obesity policy action. Additionally, school-related obesity policies were more likely than any other category to lead to successful enactment.

Jones (2010) took a qualitative approach to the state obesity legislation literature to explore the more descriptive state components that may facilitate or impede a state's childhood obesity policy introduction and enactment. To do this, Jones performed telephone interviews in eight states, completing 23 total interviews with state legislators. The states were selected based on their childhood obesity rates and their number of passed bills that were designed to reduce childhood obesity. Jones also utilized a framework designed around non-modifiable factors and modifiable factors. Non-modifiable factors can be considered legislative and legislator factors, while modifiable factors refer to bill content, political context, and public support. Jones (2010) found that Democrats were more likely to support obesity reducing legislation. States with

shorter legislative sessions were less likely than states with longer sessions to successfully present obesity reducing proposals or evidence and were, therefore, less likely to pass obesity reducing legislation.

Contrary to findings by Eyler et al. (2012), Jones (2010) found that term limits may hinder the ability of obesity legislation to be passed. Stipulations included in the legislation also influenced the success rate of obesity polices and proposed legislation that impacted taxes or required money from the state to create programs were less likely to become enacted. Additionally, characteristics of policy makers also influenced the enactment of obesity-reducing policies. For example, political party, whether or not the legislator was a minority, gender, health related education or career, and relationship to children and grandchildren all improved the odds that a legislator would support obesity legislation.

Dodson et al. (2009) expanded on an existing framework created by Schmid, Pratt, and Witmer (2006) that provides a four-part conceptual framework for physical activity policy. The framework suggests that researchers typically identify policies, examine determinants of policies, study the development and implementation of policies, and evaluate the outcomes of policies. Dodson et al. (2009) builds upon the first two phases of the framework, identification of childhood obesity prevention policies and their determinants, using qualitative methods to find more information regarding the determinants and development of childhood obesity prevention policies. The goal of the research was to increase understanding of the relationship between public health research and policy and to increase information for future policies aimed at reducing childhood obesity.

Dodson et al.'s (2009) methodology relied on key informant interviews of state-level policymakers from states of varying political climates. States were selected based on their

geographic location, adult obesity prevalence, and dominant political party between 2003 and 2005. Out of 48 interview attempts, 16 interviews between December 2005 and April 2006 were successful. The interviewees included six staffers and 10 legislators, 80% of which were Democrats. Twenty percent of participants had some formal health experience, primarily through work in law and education. All 16 participants agreed that gaining stakeholder support was an important part of getting childhood obesity policy enacted. National media exposure was also considered an important tool for pushing childhood obesity onto the policy agenda. Politically, if the bill was introduced by senior legislatures or personally interested legislatures, the likelihood of enacting legislation increased. The individuals interviewed considered lobbyists and misinformed constituents to be the top two barriers to the successful enactment of childhood obesity prevention legislation.

Determinants Studies Summary. Like the work of Boehmer et al. (2008), Eyler et al. (2012), Cawley and Liu (2008), Marlow (2014), Jones (2010), and Dodson et al. (2009), this dissertation is interested in exploring why certain state characteristics influence how states use obesity policy to reduce obesity prevalence. These studies are also important because they begin a discussion that is further developed within this dissertation concerning the reason for variation in policy between states. The determinant research differs from this dissertation's research, however, because it does not discuss the number, topic, or stringency of obesity- reducing policy being passed at the state level. The qualitative nature of Dodson et al.'s (2009) work is informative because it highlights the importance of stakeholders and national media attention, variables that are difficult to illustrate in a quantitative study. Jones (2010) also illustrates the benefits of using qualitative methods to highlight themes that cannot be found using quantitative methods, such as reasons for variation between states and the policies they enact.

Obesity Policy Prevalence Literature

Like Boehmer et al. (2008), Niggel et al. (2013) begins by using the SLRA policy categories obesity, nutrition, and physical activity to create a definition of obesity policy, but expands upon Boehmer et al.'s (2008) work on state determinants to explore the relationship between the prevalence of obesity in a state and the number of obesity related policies passed in a state. Niggel et al. (2013) uses a one-sample t-test to compare mean changes in state obesity percentage for 2000 and 2009, grouping states by geographical location to examine obesity severity among states. After determining severity, Niggel et al. (2013) calculates correlations between levels of obesity in 2009 and the number of state obesity related policies that were enacted or introduced between 2009 and 2011. The enacted and introduced policies were also compared to the mean change in obesity prevalence between 2000 and 2009 to determine whether high obesity rates increased the number of obesity related policies passed. However, Niggel et al.'s (2013) analysis determined there was not a significant relationship between the prevalence of obesity in a state and the number of obesity related policies passed.

Hersey et al. (2010) analyzed obesity legislation to explore the relationship, or lack thereof, between the passages of state obesity legislation and state obesity program funding from the CDC. Hersey (2010) focused on two grant programs managed by the CDC: the Nutritional and Physical Activity Program to Prevent Obesity and Other Chronic Diseases (NPAO) and the Coordinated School Health Program (CSH). The NPAO was created to develop science-based interventions and influence environmental changes that would encourage physical activity and provide easier access to healthy foods. The NPAO provided 20 states with grants for obesity program in 2002, which increased to 28 states by 2005. Two levels of funding were available through the CDC during this time: Capacity Building and Basic Implementation. With Capacity

Building funding, 21 states received between $266,000 and $450,000. Seven states received funding at the Basic Implementation level, which provided them with between $746,000 and $1.3 million dollars. The CSH program aimed to create collaborations between state education departments and health agencies to encourage students to adopt healthier lifestyles. In 2005, 23 states were given CSH funding and 17 states received funding from both the NPAO and CSH programs.

Hersey et al. (2010) addressed whether states with CDC funded programs were more likely to enact legislation associated with obesity, and which obesity prevention mechanisms in particular were most likely to be addressed by the legislation. To do this, Hersey et al. (2010) analyzed 135 bills enacted in 2005 by looking through four databases: the National Conference of State Legislatures (NCSL), CDC's State Nutrition and Physical Activity Program (DNPA), the La Leche League International (LLLI), and the CDC's Progress Monitoring Reporting System (PMR). The authors then used t-tests to compare the amount and type of obesity related funding between states that received the CDC funding and states that did not. The study found states that received either type of CDC grant were more than twice as likely to enact obesity–related legislation than states that had not received a grant.

Bleich et al. (2016) performed a study similar to Hersey et al. (2010) and explored whether states that were given grants by the Voices for Healthy Kids Campaign (Voices) had more legislative activity surrounding childhood obesity laws than states that did not receive the grants. Thirty grantees in 20 states were given Voices grants that ranged from $90,000 to $450,000. The authors used LexisNexus State Capital to identify bills related to childhood obesity that were introduced between November 2012 and October 2013, which served as a baseline year. Bills introduced between November 2013 and October 2014 were also analyzed to

explore whether the grants implemented one year prior had any effect. The researchers examined 217 bills in the baseline timeframe and 304 bills for the follow-up period. The researchers also compared state level variables such as the volume of legislative activity, average number of bills enacted during the legislative session, average enactment rate for the legislature, average percentage of childhood obesity bills introduced and enacted in the legislature, and average number of IOM obesity environment areas introduced per child obesity bill. A Mann-Whitney test was utilized to compare the differences between state level characteristics. Bleich et al. (2016) also used a regression-based, difference-in-difference analysis to identify changes between the baseline period and follow-up period in non-grantee states. The researchers found that states that received the grant had increased their childhood obesity legislative activity the year after the grants were introduced, but states without the grants saw little change.

Donaldson et al. (2015) expands upon studies focusing solely on childhood obesity and looks at state level factors that may influence policies trying to reduce both childhood and adult obesity. Donaldson et al. (2015) focused on obesity prevention bills listed in the Rudd Center for Food Policy and Obesity's legislative database passed between January 1, 2010 and December 31, 2013, removing bills that did not focus on prevention or included child obesity prevention. In their study, Donaldson et al. (2015) focused on a number determinants, such as the political party of the State Legislature and Governor, percentage of people living in poverty, and educational attainment of state residents. The authors also calculated the difference in the proportion of bills enacted by bill-level characteristics using a chi-square test. This study found that policies most introduced by lawmakers dealt with food and beverage taxes as well as access to healthy food, but are considered restrictive policies and are therefore least likely to be enacted. Alternatively, the lowest prevalence of bills introduced focused on physical activity and bills that lead to

healthier lifestyles like bike paths or increased access to nutritious foods are most likely to be enacted. The study also found that adult obesity legislation enactment was lower compared to the average rate of enactment for state childhood obesity policy enactment (Donaldson et al., 2015).

Prevalence Studies Summary. In their discussion of state obesity policy prevalence, Hersey et al. (2010), Bleich et al. (2016), Niggel et al. (2013), and Donaldson et al. (2015) describe the relationship between obesity prevalence and the number of obesity reducing policies enacted in a state; the influence that federal government and non-profits have on the number of state obesity policies; and the types of policies that are most likely to be passed at the state level. Although this dissertation wants to propel the discussion of obesity policy into stringency, the obesity policy prevalence lays a solid foundation by describing influences that impact the number of obesity policies being passed in a state. This discussion of number of enacted policies, however, fails to explain whether the policies being enacted more directly focus on obesity reduction or are symbolic, leading to little environmental or behavioral changes.

The determinants portion of the literature explains the state characteristics that may increase the likelihood that a state will enact obesity reducing policies. The prevalence area of obesity literature details the influences leading to an increased number of policies, but literature is needed to explain whether states are changing the prescriptiveness of obesity-related policy design due to high obesity rates, as reflected by changes in policy stringency. Additional research is also needed to discuss what leads to variation in state obesity policy stringency.

State Policy Stringency Variation of Health-Related Policies

The effectiveness of policy design is often reflected in policy stringency, however, policy design studies rarely address health problems or why variation in health policy stringency exists

among states (Koski, 2007a). While research in health policy stringency as it pertains to obesity is limited, studies of health policy stringency for other health topics provide useful information about several related focuses: health insurance coverage for immigrant children and expectant mothers, mass shootings, child passenger safety laws, and sex crime punishment legislation. Each case has variation in policy stringency among states, but for four different reasons. Researchers have identified that the rational for variation can be the response to the severity of a problem, increased regulatory powers, lack of strong policy intervention by the national government, and consistent support of state policies by the federal judicial system. Analyzing variation in state policy responsiveness in regards to other health problems can be used to identify influences that determine how policy design impacts policy stringency and leads to variation across states.

Healthcare for children of immigrants. Acevedo-Garcia and Stone (2008) explore whether state of residence impacts whether children of immigrant parents are less likely to have access to healthcare than children with both parents born in the United States. Barriers like low socio-economic status and low proficiency in English make it difficult for immigrant parents to navigate the complicated American healthcare system. Additionally, many immigrant parents struggle to understand eligibility requirements and insurance application processes, which makes it difficult for them to take advantage of available health insurance coverage. Acevedo-Garcia and Stone (2008) explored state variation in the stringency of policies designed to provide health insurance coverage for children of immigrants and accessibility to prenatal care for pregnant immigrant women. The study focused on families that included at least one immigrant parent, referred to in the study as “mixed families”. The authors organized the states according to their population of children in mixed families. The 15 states with the highest concentration were

examined to uncover information on insurance coverage on insurance coverage and prenatal care.

The authors found that out of the 15 states analyzed, only five had taken steps to provide coverage to the children of immigrants or prenatal care to immigrant mothers. California, Illinois, Massachusetts, New York, Oregon, and Washington have introduced legislation to provide insurance to the children of immigrants, a potential result of federal policies designed to reduce the number of uninsured children in the United States. California has the most immigrants in the United States, which is reflected in the strength of their public policies that allow immigrant women to seek affordable pre-natal care. Despite the level of equity policies created in these states, states like Colorado, Arizona, Nevada, and North Carolina have forgone strong immigrant health policies and exhibit higher levels of disparity between the prenatal treatments received by immigrant women and U.S.-born women.

Gun Control. Luca, Malhotra, and Poliguin (2016) explored state gun restrictions after mass shootings and found that, unlike in Acevedo-Garcia and Stone's (2008) study, states did not take steps to increase the stringency of health-related policies in response to health problem severity. Mass shootings account for only 0.3% of gun deaths, but result in a 15% increase in the number of gun-related bills introduced within the year after a mass shooting occurs. Between 1990 and 2014, 20,409 proposals were introduced and 3,199 laws passed across all fifty states. Variation among gun control policy exists between states based on the nature of their policies in part because although gun laws are established at the federal level, states are the primary regulator of firearms giving states discretion in the type and stringency of gun laws they pass. For example, Republican led states decreased gun control law stringency by 75% after a mass shooting, while Democratic leaning states made no significant changes in their gun control laws.

Thus, although mass shootings were identified as a problem as demonstrated by the increase in gun-related policies, Republican states felt that decreasing the stringency of gun control laws was the best way to approach the problem, whereas Democratic states took few steps at all.

Child Passenger Safety. The United States has twice as many child passenger fatalities as any other wealthy nation. Nearly 2,000 children die in car crashes annually, and 250,000 children are hurt. Child passenger safety laws in the United States are unique to each state because the U.S. Congress has failed to enact federal regulations that monitor vehicle operators nationally. If the federal government does intervene, it typically offers small financial incentives for states to strengthen child passenger programs. In 2014, Bae, Anderson, Silver, and Macinko (2014) analyzed the variation of child passenger safety policy stringency among states. This process involved the researchers' review of state child passenger safety laws passed between 1970 and 2010. They then conducted an analysis and found that among all 50 states, there were 194 types of law: 87 different device laws, 55 different rear-seating laws, and 52 different minor seatbelt laws. The laws were divided into five categories based on stringency: child protection under the law, action needed to comply with a law, law enforcement, penalties for non-compliance, and guidelines for who must comply with or receive exemption from the laws. Bae et al. (2014) found that states' child passenger safety laws continue to evolve as new research and technology emerge. The research also suggested that states at the forefront of research for one type of safety law were not at the forefront of other child passenger safety laws.

Sex Crimes. Every state in America has passed at least one type of sex crime legislation over the past 10 years. Mancini, Barnes, and Mears (2011) explored the variation in policy stringency by examining seven types of legislation that address sex-crime and their implementation in each state, beginning in 2008. These seven policies consist of sex offender

registries, community notification, residence restrictions, civil commitment, lifetime supervision, sex offender driver's license notation requirements, and castration laws. The goal of Mancini et al.'s (2011) research was to examine how policy stringency varies among states and to compare state policy stringency by region. They began their research by using an extensive list of state sex crime laws and information specifically detailing laws on chemical castration and driver's license notations.

The study found that there was a significant amount of variation between the laws enacted within states for five of the seven types of sex crime laws. Federal mandates require that all sex offenders register and participate in community notifications, so there was no policy variation across states for those laws. Some states have not enacted any of the remaining five law types, and no state has enacted all of them. Some states, like Texas, Florida, and Arizona, are considered "get tough" when it comes to sex offenders and have enacted six of the seven laws. Because the federal judicial system has set a precedent of upholding state sex offender laws, states have the discretion to increase the stringency of policies, as they deem necessary. States in the Northeast region of the United States are least likely to enact one of the five state-controlled sex crime laws. Variation does exist within regions, however, as illustrated by the Western region. Alaska has passed two of the seven types of sex crime laws, whereas Arizona in the same region has enacted six types of sex-crime laws.

Obesity Policy Stringency

The work of Acevedo-Garcia and Stone (2008); Luca et al. (2016), Bae et al. (2014), and Mancini et al. (2011) illustrate the difference in states' policy stringency response to health crises. Although studies examining state obesity policy stringency are slowly starting to enter

state obesity policy literature, no study yet discusses the changes in state policy stringency or explains why change in obesity policy stringency may occur. Consequently, the studies in this literature review serve only to provide and explain research on obesity policy stringency and describe the legislative landscape surrounding obesity.

Chan (2013) examined the impact of state obesity legislation on obesity levels by constructing a framework to describe the legislative landscape of states with specific focus on five guiding attributes: the intervener, the mechanism, the stakeholder, the outcome/purpose, and the alignment of new laws with CDC's recommended policies for all 50 states. Chan (2013) used policy mechanisms to measure state intervention and determine if state obesity policy intervention would impact obesity rates. To do this, Chan (2013) analyzed all obesity, nutrition, and physical activity related legislation and regulation abstracts and classified the intervention mechanisms by stringency into eight categories. Despite classifying legislation by intervention stringency, Chan's (2013) purpose was to describe the legislative landscape of states passing obesity related policies; the study did not include explanations of a causal relationship between stringency of obesity policy and increasing obesity levels over time. Moreover, the research did not indicate or inspect factors that led to variation in policy stringency among states. Chan (2013) determined there was not a significant relationship between the number of obesity policies in a state and its obesity prevalence.

Taking the stance that school nutrition policies act as a mechanism to curb increasing childhood obesity rates, Masse et al. (2013) explores whether laws focusing on school nutrition-related policies changed in strength between 2003 and 2008. Policies during this time frame were examined at the elementary, middle, and high school levels. State laws were coded using the National Cancer Institute's updated School Nutrition-Environment State Policy Classification

System (SNESPCS). Descriptive statistics were calculated and then used to reflect the status of state laws related to school nutrition as of December 31, 2008. A score of zero indicated that the state did not have a law in place, one indicated that the state laws makes a recommendation but changes are not mandated, two indicates that the state has enacted a law mandating action, but specific requirements are not provided (weak law). States given a score of 3 or higher signified that specific actions were required by law in all cases, but a higher score implies a more precise and regulatory policy (Masse et al., 2013).

As of December 31, 2008, the study found that many states had no laws or weak laws addressing education and nutrition. The areas of nutrition that were not addressed by laws in many states were BMI assessments in schools, marketing practices in schools, requirements for school meals, educational requirements for the food service director, guidelines for the types of foods used for fundraising activities at school, and establishment of a coordinating advisory or wellness team. Analysis showed that 70 percent of states had enacted some type of law requiring nutrition education, but they tended to be weak. In 10 of 16 policy areas, there were significant changes from 2003 to 2008 in the enactment of more restrictive laws, specifically in terms of competitive foods and beverages offered in elementary schools. States also increased the strength of laws establishing or coordinating advisory wellness teams to oversee school change. Most of these changes occurred at the elementary level.

Taber, Chriqui, and Chaloupka (2012) created a cross-sectional study using California as a comparison state to explore the impact of state regulation of competitive foods. California was selected because it was one of the first states to practice regulation of competitive food nutrition content, which has improved the nutrition of California students over time. In the study, states that did not regulate competitive food nutrition content were compared against California to

identify if competitive food regulation influenced the overall nutrition of students. State laws were collected from Westlaw and Lexis-Nexis legal research databases through primary legal research methods. Competitive foods are usually exempt from federal nutrition regulations and include foods that are sold in vending machines, school stores, and cafeterias. Researchers analyzed nine provisions from these three settings, focusing on three specific types of nutritional elements: fat, sugar, and total calories. Two trained coder's double-coded laws in each state and compared the results to secondary data, a process meant to verify that data collection was complete and that coding interpretations were consistent. In the coding process, laws were coded as either strong or weak. A law was considered strong if it was required, had an implementation strategy, or included the language "shall", "must", or "enforce." Laws were classified as weak if they made suggestions or recommendations and included the language such as "should", "might", and "try." California was classified as strong for all 9 provisions.

The National Youth Physical Activity and Nutrition Study (NYPANS) conducted by the CDC provided student data on nutrient intake. Data were collected through a written survey of diet and physical activity behaviors for students in grades 9 through 12. A telephone interview with a subsample of students was also used to collect detailed information on nutrition intake with the use of 24-hour recall. Overall, 20 states were represented in the 24-hour recall sample, with an average sample size of 44.5 students per state. Researchers focused on the connection between law strength and student nutrition, so four states that were considered a highly heterogeneous comparison group due to the number of laws representing strong, weak, and no relevant laws and were excluded from the study. Another state had strong provisions for all 9 domains, like California, but was excluded due to the sample size (n=12). After the survey was complete, general linear models were used to estimate differences in dietary intake between

California and the states without nutrition laws for competitive foods. The study found that, although California students consumed competitive foods in a manner consistent with the other states in the study, they consumed less fat, sugar, and calories than kids in the other states.

Lankford et al. (2013) analyzed legislation from 2001 to 2010 with the purpose of illustrating national trends in obesity legislation enactment as well as identifying which enacted bills are in compliance with IOM recommendations. State obesity legislation was collected using the key word "obesity" from the Division of Nutrition, Physical Activity, and Obesity database and each state legislature's website. Lankford et al. (2013) agreed on 714 policies that fit their guidelines. The bills were then grouped by the action of the bill or their setting, such as school physical education. If a bill overlapped in an action and setting, it was placed into the setting category. The researchers removed 103 bills because they did not have obesity as a central focus or did not aim to prevent obesity. The final 611 bills were placed into one of four categories: taskforce, school, community, and healthcare. The study found that the bills most in line with the IOM recommendations were in the school category, though each category experienced an increase in policies between 2001 and 2010. Lankford et al. (2013) found that bill language evolved in 2005 and 2006 and became more direct in outlining specific standards; in 2006, bills became more focused on community obesity prevention. The study found that the most bills passed are related to the school and taskforce categories and that all bill categories increased over time.

Stringency Studies Summary. Although the work of Chan (2013), Masse et al. (2013), Taber et al. (2012), and Lankford et al. (2013) discuss state obesity policy in the capacity of stringency, they do not approach state obesity policy stringency in the expansive nature to which this dissertation aims. First, and most importantly, none of the studies focus on the relationship

between increasing obesity rates and state obesity policy stringency, nor do they describe how state policy stringency has changed over time. Masse et al. (2013) discuss strong versus weak obesity legislation, and Lankford et al. (2013) explain how bill language has become more specific, but the studies' purposes are not to explore the influence increasing obesity rates have on increasing obesity stringency at the state level.

Secondly, this study looks at 50 different obesity policy areas that impact both adults and children in six settings. Masse et al. (2013) and Taber et al. (2012) focused only on school-related policy topics, and although Lankford et al. (2013) did examine hundreds of policies, they did so with the intent of exploring compliance with IOM recommendations and only examined enacted bills' language over a one-year span. Chan (2013) also looked at many policies, but only the abstracts. Additionally, Chan (2013) did not discuss obesity policy in terms of obesity stringency or variation in state obesity policy stringency, but was instead more concerned with whether increasing the number of obesity policies in a state lowered obesity rates within a state.

Building off components present in each of the existing stringency studies, this dissertation aims to explore the relationship between obesity prevalence in a state and changes in state obesity policy design, indicated by changing obesity policy stringency, to better understand if a relationship exists. The study will also explore if there is variation in the way in which states change the stringency of their policies depending on how their obesity rates change. Given the differences in state obesity policy responsiveness in the "determinants" and "prevalence" literature, this study is expecting some variation to exist.

Categorization of State Obesity Policy Stringency

This study is concerned with changing obesity policy design, reflected by changing state obesity policy stringency, or the directness in which policies intend to reduce obesity rates. Also looking at aspects of obesity policy stringency, Lankford et al. (2013), Chan (2013), Taber et al. (2012), and Masse et al. (2013) all use some description of stringency in their studies. Lankford et al. (2013) describe changes in the language of obesity policies in 2005 and 2006, but do not use a classification system to rank the stringency of the policies. Chan (2013) introduces eight categories of intervention that describe the policy mechanisms states use to address obesity, and although stringency is implied, there is not a ranking of policies by stringency. Taber et al. (2012) take a significant step in the classification of stringency by categorizing obesity policies as weak or strong based on the language of the policies. For example, "shall", "must", or "enforce" indicated that a policy was strong. Although Taber et al. (2012) did not assign policies to different stringency categories; their designation of strength or weakness based on language is useful in this study.

Masse et al. (2013) had, by far, the most specific categorization plan for scoring the stringency of a policy, using a point system ranging from one to six. A one indicated a weak law with no mandates, and a six indicated laws requiring the most mandated actions by states. Although Masse et al. (2013) had a category system, scores three through six were not specific and simply indicated stronger laws. Although Lankford et al. (2013), Chan (2013), Taber et al. (2012), and Masse et al. (2013) all had components that might help reflect changes in state obesity policy stringency, none of the studies had a system that fit this study perfectly. For this reason, this dissertation has created a unique system to classify and categorize obesity policy stringency. The four categories are:

1. **No Policy Influence**

   Policies that do not directly address or seek to impact obesity rates within a state. This category, for example, includes laws that fall under the categorization of nutrition, obesity, and physical activity, but actually promote agriculture within a state.

2. **Indirect Policy Influence**

   Policies that mention obesity reduction, but obesity reduction is not the primary goal. Policies within this category may include laws that create bicycle lanes or aim to increase the safety of bicyclists.

3. **Direct Policy Influence without Mandates**

   Policies created with the primary goal of obesity reduction, but do not implement mandates. An example would be states that create a public goal to increase the participation of children and adults in outdoor activities but do not include requirements to make involvement compulsory.

4. **Direct Policy Influence with Mandates**

   Policies that require state entities to take action to reduce obesity. This may include the creation of obesity reducing task forces with mandated monthly meetings.

As illustrated by the examples in Table 1, these categories were selected because they allow obesity reducing policies to be compared across states without overlap. Classifying and comparing state obesity policies using these categorizations of stringency should clearly demonstrate if and how state obesity policy stringency has changed over time in response to obesity prevalence within a state.

Table 1. Obesity Stringency Categories

Obesity Stringency Category Examples	
Stringency Category	**Example (Bill Abstract)**
No Policy Influence	**Mississippi House Bill 1566, 2010**: Exempts from sales taxation sales of food products that are grown, made or processed in the State and sold from farmers' markets that have been certified by the State Department of Agriculture and Commerce.
Indirect Policy Influence	**Colorado House Bill 1147, 2010**: Requires the development of a school curriculum regarding the safe use of public streets by users of non-motorized wheeled transportation, requires individuals in a specified age group to wear a helmet when using such transportation on public streets or public premises, provides helmet exemptions, states a helmet violation is an unclassified traffic infraction with warning enforcement, provides that parents or guardians are not subject to any legal liability due to a violation
Direct Policy Influence without Mandates	**Colorado House Bill 1160, 2010**: Amends existing law which allows health insurance carriers offering individual and small group coverage plans and the board of directors of the CoverColorado program to offer incentives or rewards, based on outcomes, to encourage participation in a wellness program, allows carriers to base the incentives or rewards on satisfaction of a standard related to a health factor if the incentive is consistent with nondiscrimination provisions of the Health Insurance Portability and Accountability Act of 1996
Direct Policy Influence with Mandates	**California Assembly Bill 290, 2013**: Amends the California Child Day Care Act to require that as a condition for licensure of a child care facility, after January 1, 2016, a director or teacher who receives the health and safety training also must have at least one hour of childhood nutrition training as part of the course. Requires the training to include content on age-appropriate meal patterns. Authorizes the Emergency Medical Services Authority to establish training through bulletins from the director, until regulations are adopted

Propositions

Overall, the literature review has demonstrated that obesity is a problem that negatively impacts the fiscal and medical health of the United States. The growing severity of the obesity epidemic has not received appropriate attention from policymakers in all states. Findings indicate that obesity prevalence does little to increase the number of state obesity policies, but grants provided by non-profits and government entities have been found to influence the number of obesity-related policies enacted in a state (Niggel et al., 2013; Hersey et al., 2010; Bleich et al., 2016). While the relationship between high prevalence's of obesity in a state and changes in policy design changes, as indicated by changes in obesity policy stringency, have not been explored, studies have given insight to how policy design has led to policy variation in the area of renewable energy and CAFOs (Yin & Powers, 2009; Carley and Miller, 2012; and Koski, 2007a, 2007b). The literature has also provided introductory information on variation in obesity policy stringency; specifically the types of obesity policy most likely to be enacted and the policy changes state legislatures are making to better address obesity (Lankford et al., 2013).

Based on the state-level factors that influence policy design variation and obesity policy stringency mentioned throughout the literature review, this dissertation proposes:

P_1: Casual state policy design addressing the obesity epidemic will be reflected in a consistently high prevalence of obesity and lack of change in obesity-policy number over time.

P_2: Stringent state policy design addressing the obesity epidemic will be reflected in a consistent number of obesity-related policies and low prevalence of obesity over time.

P_3: A state with policy designs increasing in stringency will experience decreasing obesity prevalence over time.

P_4: A state with policy designs decreasing in stringency will experience increases in obesity prevalence over time.

P_5: A state with a consistently high prevalence of obesity will have obesity-related policies with low levels of stringency.

P_6: A state with a consistently low prevalence of obesity will have highly stringent obesity-related policies

P_7: Affluent states will have more stringent obesity-related policy designs, reflected in a lower prevalence of obesity.

P_8: States with strong health interest group influences will have more stringent obesity-related policy designs, reflected in a lower prevalence of obesity.

P_9: States with a Democratic governor will have more stringent obesity-related policy designs, reflected in a lower prevalence of obesity.

P_{10}: States with Democratic control of the state legislature will have more stringent obesity related policy designs, reflected in a lower prevalence of obesity.

P_{11}: States where obesity-related policies have been predominately sponsored by Democrats will have more stringent obesity-related policy designs, reflected in a lower prevalence of obesity.

Literature Review Conclusion

In many ways, the obesity health crisis has many similarities to the tobacco crisis and, therefore, many policy interventions used to reduce tobacco usage have been recommended for obesity reduction. The inability to remove food from daily life, as in the case of tobacco, highlights the vast importance of policy intervention as a tool to create default health options and

make healthy decisions more easily achievable. Although studies have found that obesity prevalence does not often lead to an increase in the number of state obesity policies, no study has yet looked at the relationship between state obesity prevalence and changes in policy design as reflected by changes in state policy stringency. Analyzing the policy design and stringency of obesity policies is important because fewer more stringent policies have the potential to better address obesity than large quantities of weak policies (Lankford et al., 2013). The need to explore obesity policy stringency has led to a new classification and categorization of obesity policy stringency, which will increase understanding of how states respond to high obesity rates.

Overall, the literature review served to illustrate the importance of policy design in addressing the obesity epidemic, identify the need to study the relationship between obesity policy stringency and obesity prevalence in a state, and describe the theoretical and conceptual frameworks acting as a foundation for this dissertation.

CHAPTER THREE

METHODS

This chapter will outline and describe the multiple case study design that is used for this dissertation. The chapter is organized into the following sections: justification for selecting multiple case study research design, detailed explanation of case study selection, key differences existing between the states that were selected as case studies, unit of analysis, how obesity policy data are collected and analyzed, criteria to ensure quality, as well as the limitations and delimitations of the study.

Multiple Case Study Research Design

Three conditions were considered when selecting the methodology for this dissertation: the type of research question posed, the extent of control the research has over human behavior and events, and the degree of focus on contemporary events as opposed to concentrating on only historical events (Yin, 2014). Taking these guidelines into consideration, case study research is fitting due to the nature of the research question; lack of control over state policy makers and their legislative actions at the state level; and the relatively short and recent timeline of policy action regarding obesity reduction. In terms of the research question, the focus on whether or not states change the stringency of their obesity policy and how this varies among states is consistent with one of the purposes of case studies, which is to illuminate a decision or set of decisions by describing why the decisions were made, how the decisions were implemented and with what result (Schramm, 1971). Additionally, due to the use of secondary data and lack of affiliation with state level policy makers, the researcher in this case is simply analyzing data and has no control on the decisions made by policymakers or programs that may lead obese individuals to

make healthier choices as would be the case in an experimental design. Lastly, the timeframe for studying obesity policy is relatively recent. Although concerns over obesity and its consequences have been increasing since the 1950s, only after the Surgeon General's call to action in 2001 did states increase the number of enacted legislation aimed at reducing obesity (Center for Disease Control and Prevention, 2017). Using a multiple case study approach also allows temporal and geographic analysis of each state (Yin, 2014).

In addition to meeting the guidelines set forth by Yin (2014), case study research was selected due to its ability to highlight the variation in obesity policy that exists among states. A preliminary investigation of policies in all 50 states between 2001 and 2014 yielded 2,409 enacted policies related to obesity. For a qualitative study, 2,409 policies in 50 states would make it difficult to identify all key factors that could impact a state's decision to make their policies more or less intense. The need to identify changes in stringency and variation among states made case study research an appropriate choice. Furthermore, it was determined that a holistic multiple case study would most effectively identify variation in policy stringency. This decision is appropriate because analyzing four case studies holistically allows each case to be analyzed individually, but also compared to each other to portray a larger picture of the relationship between state prevalence of obesity and changes in state obesity policy stringency, clearly illustrating a phenomena. Multiple case study design provides a level of robustness that cannot be found in a single case study because it allows one phenomenon to be analyzed in more than one example. Comparison of more than one case study increases the likelihood that findings are corroborated, qualified, and extended beyond the information that a single case study can provide (Yin, 2014; Theiler, 2012).

Case Study Selection

The four states were selected based on their obesity rates over time and classified by: consistently high obesity rates, high to low obesity rates, low to high obesity rates, and consistently low obesity rates between 2003 and 2010. Selection of the case studies began by collecting the obesity percentages of each state. The data were provided by the State of Obesity, a database of state obesity information produced by the Trust for America's Health and the Robert Wood Johnson Foundation based on data collected yearly by the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is a health-related telephone survey produced by the CDC that collects information for all 50 states, the District of Columbia, and three U.S. territories. Approximately 400,000 BRFSS surveys are completed annually (Center for Disease Control and Prevention, 2016). The State of Obesity database provides obesity rankings and state percentages for all 50 states sporadically between 1990 and 2000 and consecutively between 2003 and 2014.

Examination of the State of Obesity's methodology revealed a change in the BRFSS in 2011, disallowing comparison of data before and after 2011. The main changes to the survey included the addition of cellular telephones to data collection methods in order to account for the growing number of people without landlines. Demographical changes implementing new statistical weights to target populations were also made. This was done to ensure that race and ethnicities like Asians, Pacific Islanders, American Indians, and Native Alaskans, may be overlooked in some states due to their small populations, were represented in the survey (State of Obesity, 2013). For this reason, the case studies were selected from a timeframe of 2003-2010.

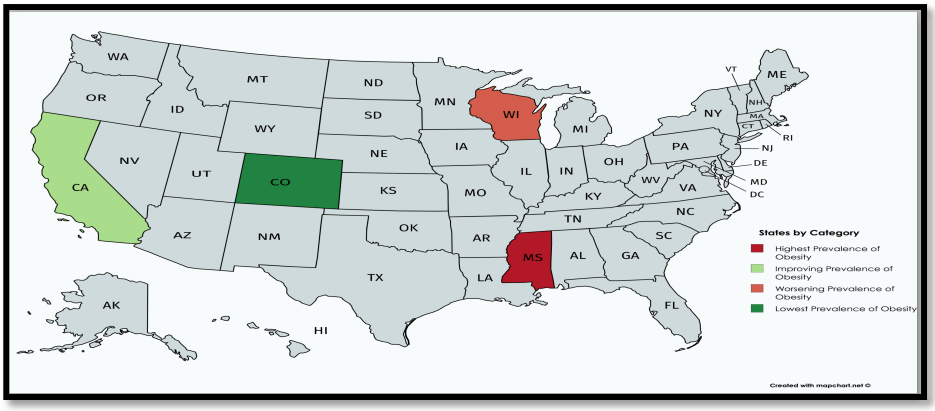
Focusing on data between 2003 and 2010, simple descriptive statistics were calculated for all 50 states. Simple descriptive statistics were first used to determine which states would

represent the high and low categories. The average percentage of adult obesity was calculated for all years between 2003 and 2010 (M=24.8) as well as the standard deviation (SD=2.8). Only two states, Colorado and Mississippi, were two standard deviations above and below the mean, respectively. The average percentage difference (M=-0.67) was calculated to determine which two states experienced the largest increase and decreases in obesity percentage between 2003 and 2010. The standard deviation was also calculated (SD=0.22). Wisconsin was two standard deviations below the mean, and California was two standard deviations above the mean. As a result of the calculations, Mississippi, Colorado, California and Wisconsin were the four cases selected for this dissertation.

Key State Differences

Mississippi, Colorado, California, and Wisconsin all represent different experiences with rising obesity rates. These differences are also reflected in their geographical locations as shown in Figure 3. This section serves as a brief introduction to the four case studies and an opportunity to highlight some unique characteristics that may influence different approaches to obesity reduction policy.

Figure 3. Map of Case Studies



Mississippi is currently ranked second in obesity percentage amongst all 50 states. Although second only to Louisiana at the moment, Mississippi has ranked number one for obesity prevalence more than any other state in the nation (State of Obesity, 2016). Mississippi is located in the southern region of the United States. Caucasian citizens account for almost 60 percent of residents, and Africans Americans accounting for the second largest demographic in the state with 38% of the population (United States Census Bureau, 2016). Mississippi is predominately Republican in state representation (Government of Mississippi, 2016). Currently 62% of the Senate is Republican, 59% of the House of Representatives is Republican, and the Governor is also Republican. One in three Mississippians is classified as obese and obesity costs are skyrocketing in the state. In 2008, Mississippi spent $925 million in health costs directly related to obesity. It is anticipated that if major changes do not occur in Mississippi, health costs will reach $3.9 billion by 2018 (Mississippi Medical Center, 2016).

Colorado is located in the Rocky Mountain Region in the western part of the United States. Politically, Republicans and Democrats are fairly balanced. Representation in the Senate is split with 17 Democrats and 18 Republics. The statistics are similar in the House of Representative with 37 Democrats and 28 Republics. The current governor is a Democrat (National Conference of State Legislatures, 2017). Demographically, Caucasians account for 87.5% of the population. Colorado has had a vastly different experience with obesity and has historically had the lowest rate of obesity in the country (Colorado, 2016). Prior to 2011, Colorado was the only state with obesity rates below 20%. In 2009, Colorado spent $1.64 billion treating obesity related diseases (LiveWell Colorado, 2016).

California has the largest state population in the country. California is culturally diverse and has an equal percentage of Caucasian (39%) and Hispanic (39%) residents. The foreign born

population of California is also high at 25% (Kaiser Family Foundation, 2015). California is a blue state illustrated by the Democrats control of the Senate (67.5%), House of Representatives (69%), and governor's office (National Conference of State Legislatures, 2017). California has the highest obesity-related costs in the United States, estimated at $15.3 billion with 41.5 percent of those costs financed through Medicare and Medicaid.

Wisconsin is located in the mid-western part of the United States and bordered by two Great Lakes. The state is predominately Caucasian with a percentage mirroring Colorado's at 87.6%. Currently, Wisconsin is a red state with control over the Senate (90%), House of Representatives (85%) and the governor's office (National Conference of State Legislatures, 2017). Wisconsin's obesity rates have gradually worsened, which has led to $1.5 billion in spending annually towards obesity-related medical expenses (Wisconsin Department of Health Services, 2008).

Unit of Analysis

The unit of analysis for this dissertation is state policy, which is emphasized by the focus on obesity policy stringency at the state level. Selection of state-level policies illustrating stringency was done through use of the SLRA database, which is maintained by the CDC, by filtering policies by health category, policy topic, setting, and status. These sorting terms were established by the CDC after review of legislation records and comparison of policy topic notes and built into the SLRA database (Center for Disease Control and Prevention, 2017).

Data Collection

To determine whether stringency among states has changed, policies related to state obesity between 2001 and 2015 were collected, analyzed and classified based on stringency. Although data on state obesity prevalence were not provided for states before 2003 and is limited to 2010 due to changes in the BRFSS data collection methods, data are available for state obesity policies for years 2001 through 2015. Unlike the research of Niggel et al. (2013) and Chan (2013), this dissertation will analyze the full content of state policy, not just abstracts. Analyzing the full legislation of documents is important because insight into the intention and intended implementation of the policies can be gained. This insight is lacking when just the policy abstract provided in the SLRA database is analyzed. Failure to read the entire obesity policy makes it difficult to determine which stringency classification each policy should be given.

Focusing on obesity-related policies within the timeframe 2001 to 2015 was selected for two reasons. First, the Surgeon General's initial call to action occurred in 2001 emphasizing obesity prevention policies through five recommendations that included: promoting the recognition of overweight and obesity as a significant health concern; persuading Americans to increase their physical activity and increase their nutrition; identifying effective ways to treat obesity in a culturally sensitive manner, encourage environmental changes, and taking advantage of public-private partnership incentives aimed at lowering obesity rates. These five steps represented the first significant steps towards combating and reducing obesity rates (Surgeon General, 2001).

Once the dates were selected, legislation deemed relevant to include in the SLRA database by the Division of Nutrition, Physical Activity, and Obesity within the CDC (DNPAO), were collected for California, Colorado, Mississippi, and Wisconsin and sorted by health

category, policy topic, setting, and status resulting in 211 policies for analysis. Consistent with work done by Niggel et al. (2013) and Chan (2013), obesity related policies include all nutrition, obesity, and physical activity policies with the goal of lowering obesity prevalence. The settings included early care and education; community; medical and/or hospital; restaurant/retail; school/after school; and work place. There were 50 policy topic areas as illustrated in Table 2, and all were present in at least one of the four case studies. The sorting identified that California had 131 policies, Colorado, 36, Mississippi had 32, and Wisconsin trailed with 12, which was analyzed to identify trends in number and stringency.

Table 2. SLRA Policy Topics

SLRA Policy Topics				
Appropriations	Farm Direct Foods	Menu Labeling	Healthier Food Retail and Food Deserts	Food Policy Councils
School Nutrition	Food Assistance Programs	Liability and Indemnity	Public Safety	Safe Routes to School
Medical Care	Fruits and Vegetables	Nutrition Standards	Task Forces/ Councils	School siting
Agriculture and Farming	Physical Education Requirements	Chain Restaurants/Zoning	Health Insurance Coverage	Trans Fats
Bicycling	Access to Health Foods	Farmers Markets	Physical Activity Requirement	Counter Advertising
Initiatives and Programs	Disparity/Equity	Public Transportation	Sugar Sweetened Beverages	Food Security
Food Restrictions	Parks, Recreation, and Trails	Incentives	Access to Drinking Water	Media Campaigns
Pedestrians/Walking	Body Mass Index	Built Environment and Street-Scale Design	Vending	Disabilities
Portion Size	Access to Recreational Opportunities	Correctional Facilities Farm Programs	Front of Package Labeling	Breastfeeding

Signage for Recreation and Transportation	Marketing Restrictions	Sodium	TV/Screen Viewing	Point of Purchase Promotion

Data Analysis

Once the policies were fully sorted they were analyzed individually by state and year and assigned to one of the four stringency categories outlined in the literature review as demonstrated in Table 3. Once all 211 policies were placed into a category, the scores were calculated for each year for each state using weighted averages. Stringency categories were given the weight of their category to account for the number and stringency of enacted obesity-relate policies. For example, policies with a stringency score of one were given a weight of one and stringency scores of four were given a weight of four as illustrated in Figure 4. The stringency totals were calculated first, which consisted of counting the weighted policies for each year. The stringency average was then calculated by dividing the number of policies for each year by the stringency total for each year. The stringency total and stringency average are both important due to the different information they provide. The annual stringency total indicates the annual total effort each state took to address obesity between 2001 and 2015, whereas the stringency average highlights the stringency effort by policy taken to combat obesity for each year.

Table 3. Obesity Stringency Category Examples

Obesity Stringency Category Examples	
Stringency Category	**Example (Bill Abstract)**
No Policy Influence	**Mississippi House Bill 1566, 2010**: Exempts from sales taxation sales of food products that are grown, made or processed in the State and sold from farmers' markets that have been certified by the State Department of Agriculture and Commerce.
Indirect Policy Influence	**Colorado House Bill 1147, 2010**: Requires the development of a school curriculum regarding the safe use of public streets by users of non-motorized wheeled

	transportation, requires individuals in a specified age group to wear a helmet when using such transportation on public streets or public premises, provides helmet exemptions, states a helmet violation is an unclassified traffic infraction with warning enforcement, provides that parents or guardians are not subject to any legal liability due to a violation
Direct Policy Influence without Mandates	**Colorado House Bill 1160, 2010**: Amends existing law which allows health insurance carriers offering individual and small group coverage plans and the board of directors of the CoverColorado program to offer incentives or rewards, based on outcomes, to encourage participation in a wellness program, allows carriers to base the incentives or rewards on satisfaction of a standard related to a health factor if the incentive is consistent with nondiscrimination provisions of the Health Insurance Portability and Accountability Act of 1996
Direct Policy Influence with Mandates	**California Assembly Bill 290, 2013**: Amends the California Child Day Care Act to require that as a condition for licensure of a child care facility, after January 1, 2016, a director or teacher who receives the health and safety training also must have at least one hour of childhood nutrition training as part of the course. Requires the training to include content on age-appropriate meal patterns. Authorizes the Emergency Medical Services Authority to establish training through bulletins from the director, until regulations are adopted

Figure 4. Stringency Calculation Examples

Stringency Calculation Examples							
Year	**1**	**2**	**3**	**4**	**Stringency Total**	**Number Total**	**Stringency Average**
California							
2009	**2** 2*1= 2	**5** 5*2=10	**0**	**0**	**12** 2+10	**7** 2+5	**1.7** 12/7

This process helped identify policy stringency trends between 2001 and 2015 for both individual state analysis as well as cross-state comparisons. Part of this process included identifying the policy topic of each piece of legislation to identify how obesity policy topics have

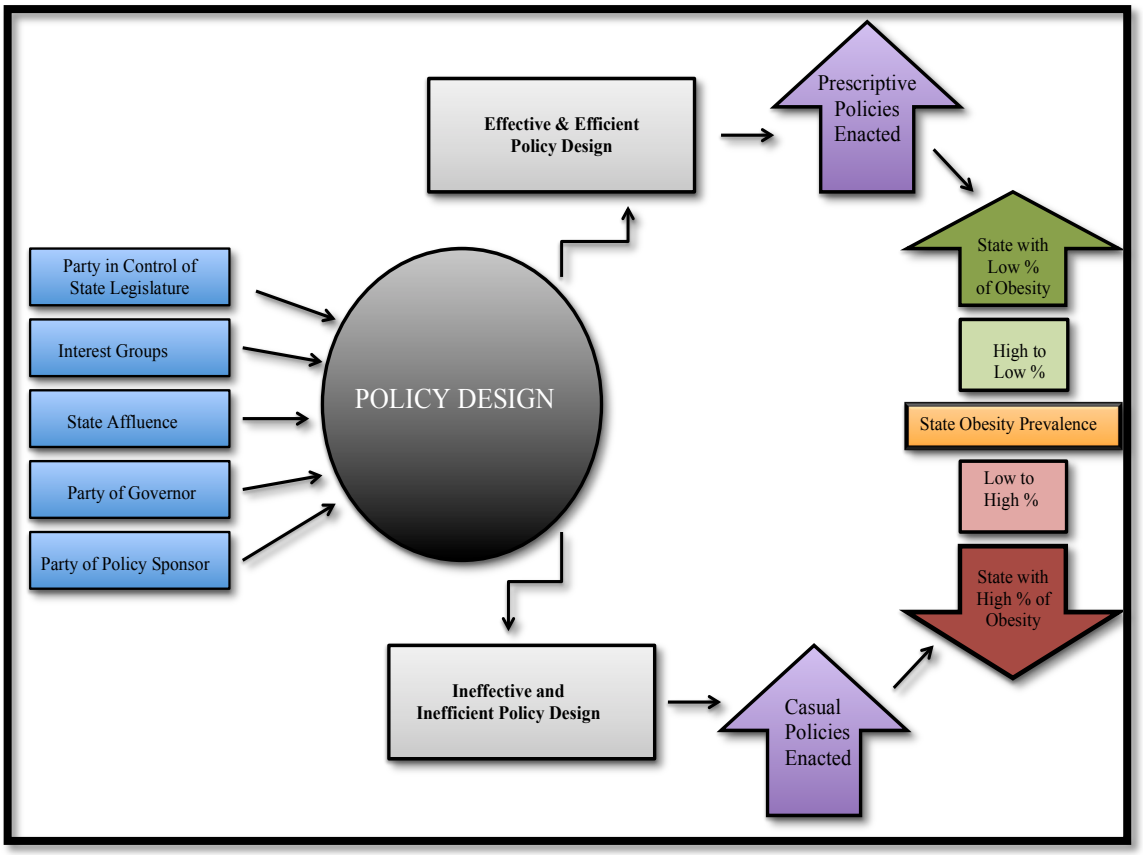
changed over time. After this process was completed for all four states, and trends were identified, the four case studies were compared to each other holistically. The findings were also compared to the propositions to distinguish if the initial assumptions were correct. Once the information revealed the obesity policy stringency trends, the data were compared with existing literature on state obesity policy determinants to establish if the findings of this dissertation are consistent with previous findings and to evaluate if there are any additional factors that can explain policy stringency variation among the four case studies.

Obesity Policy Stringency Variation

When exploring policy design and its impact on policy stringency, it is not uncommon to witness variation, especially with a contentious topic like obesity. State policy makers face several competing interests from constituents holding different opinions on whether obesity is an individual problem or a societal problem in need of government intervention (Turner et al., 2009; Niderdeppe et al., 2012; & Kim & Willis, 2009). At the same time, policy designers must also make smart policy design decisions to avoid becoming a target of interest groups like the food industry (Schroff et al., 2011). Additionally, policy designers may experience policy design constraints due to state financial problems that make it difficult to create new programs. Even if states have the support of the public and interest groups, they cannot create programs to combat obesity they cannot fund. For these reasons, state affluence, interest group influence, political party of each state's governor, party in control of the state legislature, and the political party of the policy sponsor will be analyzed to explore if they lead to variation in obesity policy stringency across states. As shown in Figure 5, each of these variables are consistent with the conceptual framework for this paper and have also been identified as characteristics that

influence policy design leading to variation in state policy stringency in other policy areas (Carley & Miller, 2012; Yin & Powers, 2009; Koski, 2007a,b).

Figure 5. Conceptual Framework



Affluence. Scholars studying the relationship between policy design and policy stringency have explored whether state affluence influences the focus that government's put on social regulatory issues (Kraft, 2000). Carley and Miller (2012) and Koski (2007b) both found that the more affluent a state is, the more likely they are to invest public resources into expanding renewable energy, which is reflected in the stringency of their policies. So far, no studies have explored the relationship between state affluence and health policy stringency. To test if state affluence influences obesity-related policy stringency, this study explored if state affluence led to

stronger policy designs as represented by more stringent obesity-related policies. For this topic, state affluence indicates the wealth of a state and data for this measure were acquired from the United States Bureau of Economic Analysis, a department within the U.S. Department of Commerce. Affluence is measured quantitatively by the per capita real gross domestic product (GDP) of each case study for every year between 2001 and 2015. The per capita real GDP was selected because it divides the real GPD of a state by the population, which accounts for the different size of each state (Bureau of Economic Analysis, 2016).

To determine if state affluence influences obesity-related policy stringency, the stringency scores and the per capita real GPD for each state, were divided by year, and compared for every year between 2001 and 2015. Next, the stringency scores and the per capita real GPD was placed into a table with dual y-axes to analyze the trends with the purpose of determining if stringency scores and the per capita real GPD increased and decreased during the same years. Data were analyzed to investigate if years with high per capita real GPD led to more stringent obesity-related policies within a two-year span. For example, if the per capita real GPD score was very high in 2006 then stringency scores for 2006, 2007, and 2008 were analyzed to identify any trends. If years with high per capita real GPD measurements consistently led to increased stringency scores within one or two years, then it will be determined that state affluence does influence obesity-related policy stringency.

Health Interest Group Influence. Policy design is often dictated by competing interests and may lead to varying policy stringency depending on the stance of the policy design architect (Stone, 1989; May, 1991; Koski, 2007a). Interest groups are a powerful entity in policy-making because they are often undeterred by the presence of alternative policy design options. Additionally, the willingness of interest groups to utilize legal means to shape policy so it favors

their wants and needs, justifies closely analyzing the relationship between the influence of interest groups and state policy design, as reflected by obesity-policy stringency (Woods, 2005; Waterman, Rouse, & Wright, 1998). In terms of the relationship between interest groups and health policies, Finchman (2010) and Szper (2010) found that the presence of health interest groups did improve the probability that healthcare legislation would receive support.

For this study, health interest groups are considered any non-state entity that contributes money or favors in an attempt to persuade policy designers to create policies that support the stance of health interest groups (Koski, 2007b). Using data from the National Institute on Money in State Politics, interest group influence was measured by the monetary contributions of health interest groups in dollar amount to each of the four case studies. Interest group contributions to states are measured by the total dollar amount documented in the mandated finance reports filled out by political candidates and given to disclosure agencies. The National Institute on Money in State Politics collected and calculated the money claimed in the mandated finance reports and created a database breaking down interest group contributions by industry and state. For health interest groups, the disclosed amounts collected in each state reflect significant variations in contributions from year to year (National Institute on Money in State Politics, 2017). The Institute was selected because it is one of the few organizations that focus on interest group contributions at the state level (Research for Justice Datacenter, 2017).

To analyze the influence of interest groups on obesity policy stringency, monetary contributions by health interest groups for every year between 2001 and 2015 were put into a table and compared to obesity-policy stringency scores for all years between 2001 and 2015. To standardize the monetary contributions to account for state size, the contribution amounts were divided by both the state population and state personal income of each case study. Once again, a

dual y-axis graphs were utilized for both population and state personal income calculations to illustrate whether years with higher health interest group contributions lead to more effective policy design, and therefore more stringent policies in the same year or the year after. Data were analyzed to explore whether years with high health interest group contributions led to more stringent obesity-related policies in the same year, or the year after. For example, if health interest groups contribute significant sums of money in 2003, then stringency scores in 2003 and 2004 were analyzed to identify whether stringency scores increased. If years with higher health interest group contributions repeatedly led to high stringency scores, then it will be determined that health interest group contributions do influence obesity-related policy stringency.

Governors. Governors were included in this research due to their role as the chief administrator of bureaucracy in their state (Koski, 2007a). Political executives are often influential in the successful passage of state policies as they have veto power over policies they do not support and also have control over the policy design behaviors of those responsible for creating policy (Dickes & Crouch, 2015). This study examined if the party of the governor influences the effectiveness of policy design as reflected in the stringency of obesity policy. For this study, governors are considered the top state executive and data detailing the political party of each governor in the four case studies for every year between 2001 and 2015 will be obtained from the National Governors Association database. There were no independent governors between 2001 and 2015 in any of the case studies, so governors were classified as either Democrat or Republican.

The data for the party of each governor were divided by state and year and analyzed against state policy stringency scores for every year between 2001 and 2015 to determine whether or not the party of the governor influences obesity-related policy designs. The analysis

for this variable consisted of putting party of the governor and stringency scores in tables and comparing them side by side to explore whether stringency scores were higher in years when a Democratic governor was in office. If years with Democratic governors yield consistently higher stringency scores, then it will be determined that the presence of Democratic governors does lead to more stringent obesity-related policies.

Party in Control of the State Legislature. Party in control of the state legislature was chosen as a factor for analysis due to the varying emphasis put on social regulations by liberal and conservative parties (Koski, 2007b). State legislatures, sometimes referred to as the General Assembly, form the legislative branch of state governments. Nebraska is a unicameral legislature with only one house, but all other states have an upper and lower house. When one party has control of both houses they are considered to have control of the legislature, but the state is considered to be a divided government, or have split control if each party has control of one of the houses (National Conference of State Legislatures, 2017). Analyzing the influence that political party majority has on obesity-related stringency is important because the party holding the majority in a state are more likely to have greater agenda-setting powers and therefore more likely to influence policy outcomes (Cox, Kousser, & McCubbins, 2010).

To analyze the data, the party in control of each case study's state legislature for the years 2001 to 2015 was recorded. Next, the information was compared to policy stringency scores to identify if the control of the party influenced the stringency of obesity policy in the same year being analyzed or the year after. Placing each party in control into a table and comparing the party against stringency scores allowed for the analysis of the influence that the majority party has on the stringency of obesity-related policies. If years with Democratic control of the

legislature leads to more stringent obesity-related policies, it will be determined that Democratic control of the state legislature leads to more stringent obesity-related policies.

Political Party of Policy Sponsor. Political party of the sponsor was selected due to the likelihood that the political ideology would be expressed in the language and problem definition included in the legislation by the bill sponsor (Koski, 2007a). Political party sponsors are the political representatives that introduce, develop, and advocate for a specific policy. Traditionally, liberal political parties create policy designs that favor strong social regulations whereas conservative parties approach policy issues with a more hands-off policy design style. These differences often lead to variations in policy design approach across each party (Wright, Erikson, & McIver, 1987). For the purpose of identifying whether the political party of the policy sponsor influences obesity-related policy stringency, the policy sponsor for every obesity-related policy was identified by the SLRA database. Next, the policy sponsor was cross-referenced with their state's governmental website and classified as a Democrat, Republican, or Independent. Policies sponsored by a committee consisting of multiple political parties were classified as a joint-committee sponsor.

To determine whether there was a relationship between party of the policy sponsor and changes in obesity-related policy stringency; policies were divided by state, year, and number of policies enacted by Democrats, Republicans, Joint Committees, and Independents. Policy sponsorships by party were then totaled to identify whether Democrats, Republicans, Joint Committees, or Independents enacted more stringent obesity-related policies. Stringency scores for each state were then placed into a table with the party of the policy sponsor so that the data could be easily compared for every year between 2001 and 2015. If Democratic policy sponsors

enacted more stringent policies than policy sponsors of other parties, it will be determined that the presence of Democratic policy sponsors does influence obesity-related policy stringency.

Criteria for Quality

Reliability. The use of content analysis to classify policies into categories of policy stringency has the potential for high reliability, but can be plagued by bias (Insch, Moore, & Murphy, 1997). There is an aspect of subjectivity associated with assigning obesity policy stringency to a category, although great lengths have been taken to ensure rigor. One main step that the researcher will take to avoid bias is to become familiar with existing literature through the formation of a literature review. Using the literature review as a foundation, the researcher will analyze data to ensure that there are no contradictory findings. If there are contradictory findings then policy stringency categories may be subject to change and the classification process will be re-started. In addition to using the SLRA database to collect information on state policy, alternative sources are used to collect information that is used to describe and highlight the unique differences that will help identify why states may vary in their obesity policy stringency.

Validity. Each obesity, nutrition, and physical activity related piece of legislation and regulation are reviewed and then assigned to one of four categories. Peer debriefing, referential adequacy, and inter-rater reliability is utilized to improve validity. Peer debriefing provides an opportunity to ask for confirmation regarding the placement of policies into one of the four categories, but will only be used if there is confusion over which classification a policy should be given. Referential adequacy will ensure that the findings of this study are consistent with existing literature (Hays & Singh, 2012). Inter-rater reliability helps to improve the likelihood that

researchers will consistently assign policies the same stringency categories. Inter-rater reliability will be achieved by having a third party researcher code 10% of the obesity-related policies into one of the four obesity policy stringency categories (De Swert, 2012). If the third-party researcher assigns the policy to the same category 70% of the time, the stringency categories are considered reliable (Miles & Huberman, 1994). If the third-party assigns obesity policies to the same stringency categories I have selected less than 70% of the time I will discuss the classification issues with the researcher to come up with a solution that will make the appropriate stringency categories more well-defined and more easily selectable. Lastly, the use of multiple case studies provides numerous comparisons to discount rival hypotheses, which helps improve validity (Yin, 2014).

Limitations

There are two main limitations to this study. First, the study has low external validity because the findings in Mississippi, Colorado, California, and Wisconsin cannot be generalized to other states. The dissertation expects to offer a theory or trend pertaining to obesity policy stringency, but results revealing whether all states with similar obesity prevalence's have the same level of policy responsiveness is outside the scope of this study (Stake, 2005). The second limitation is the researcher's reliance on secondary data taken from the CDC, Trust for America's Health, and the Robert Wood Johnson Foundation. The assumption is that all three organizations can be trusted and their information is reliable.

Delimitations

Only the SLRA database created and monitored by the CDC is used for this study. Alternative obesity policy database sources, like the National Conference of State Legislatures (NCSL) and Connecticut University's Rudd Center databases were considered for use, but did not provide the necessary data needed for this dissertation. For example, the NCSL database only contained information pertaining to childhood obesity and the Rudd center database only had obesity policy data for the years 2010 to 2016.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter will present the results of the obesity-related policy content analysis. The data, 211 obesity-related policies from four states, were collected and analyzed in response to the research questions introduced in chapter one. To clearly present the findings, this chapter will be organized into two parts based on the research questions presented in chapter one. The first section will address research question number one by explaining the findings associated with state obesity prevalence, stringency of state obesity policies, and the number of state obesity policies enacted within a state. The following section will focus on the second research question and the factors that lead to variation in state obesity policy design and stringency, as well as the related research propositions. Finally, summaries of the case studies and a conclusion will complete the chapter.

Part One, Research Question One: *Has state obesity policy design, as reflected by obesity policy stringency, changed in prescriptiveness as state obesity prevalence increased?*

Findings by State

To analyze changes in state obesity policy stringency and number over time, 211 obesity-related policies from the states Mississippi, Colorado, California, and Wisconsin were collected from the SLRA database between 2001 and 2015. Analysis of the policies led to the elimination of 11 policies. Duplicate policies were removed, as were budgetary policies that did not include written content and consisted solely of budgetary numbers. The budgetary policies were

eliminated because they did not contain the language necessary to assign the policies to one of the four stringency categories. As mentioned in chapter three, the stringency of each state was calculated by weighting stringency scores for each year and then calculating stringency averages and stringency totals. Stringency scores without specifically identifying average or total are referring to both scores and the overall change in average and total. The number of policies was calculated by counting how many obesity-related policies each state enacted between 2001 and 2015. The following section presents the policy stringency and number results for each of the four case studies and also addresses propositions one through six.

Mississippi. Mississippi was selected for this study due to its historically high prevalence of obesity. Mississippi's geographical location in the south is reflected by some distinct factors that may be partially to blame for the state's high obesity rates, such as traditional southern foods, high rates of poverty, and lack of physical activity (Suddath, 2009). Southern foods such as fried chicken are considered unhealthy and a clear contribution to obesity if not in moderation, but other subtler causes must be accounted for as well. For example, Mississippi is not only one of the most obese states in the nation, but also one of the poorest. Individuals below the poverty line often forgo more expensive food staples like fruits and vegetables for more calorie-dense processed foods that are more affordable, which could cause them to become obese (Suddath, 2009).

In terms of physical activity, southern states lack the public transportation in rural areas that may be more prevalent in other regions, which limits daily physical activity like walking to bus stops and leads to a reliance on transportation by vehicles (Brown, 1999). Additionally, the hot humid weather could act as deterrence for walking to work or using available public transportation (Suddath, 2009). Despite the possible factors that could be responsible for

problems with obesity in Mississippi, more stringent policy design could be an effective means to alleviate some of these issues. The state government in Mississippi has taken some policy steps to improve these policy problems by allocating funds to increase physical activity in schools and improve nutrition, but studies have not been clear on whether or not these actions have been effective (Grant et al., 2016).

Despite the policy options that Mississippi could have pursued in an attempt to alleviate and improve the prevalence of obesity in the state, the findings of this study indicate that Mississippi did not drastically increase the number of obesity-preventing policies being enacted in the state, reflecting consistency in the number of obesity-related policies being passed. As illustrated by Table 4, analysis of obesity-related policies in Mississippi between 2001 and 2015 revealed that the number of obesity-related policies in Mississippi started low at one policy in 2001 and 2002 before increasing in 2003 and leveling out until 2009 when the numbers of policies reached their highest points in 2009 and 2010. After their peak in 2010, the number of obesity-related policies fell again between 2011 and 2014, before tapering off to zero in 2015. Although Mississippi held the number one ranking for obesity prevalence in the country for much of the analyzed time frame between 2001 and 2015, it did not appear there was urgency on the part of Mississippi legislators to combat high obesity prevalence through policy. Concern over reducing obesity rates was not reflected in the number of obesity-related policies enacted in Mississippi. The findings were consistent with Niggel et al. (2013), who concluded that states do not increase the number of obesity-related policies they enact based on the severity of their obesity problem.

Table 4. Mississippi Policy Stringency and Number Scores

	Mississippi						
	1	2	3	4	Stringency Total	Number Total	Stringency Average
2015	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
2014	0	0	1	0	**3**	**1**	**3**
2013	0	0	0	1	**4**	**1**	**4**
2012	0	0	1	0	**3**	**1**	**3**
2011	0	2	0	1	**8**	**3**	**2.7**
2010	3	3	0	1	**13**	**7**	**1.9**
2009	4	0	0	1	**8**	**5**	**1.6**
2008	1	0	1	0	**4**	**2**	**2**
2007	0	0	0	1	**4**	**1**	**4**
2006	0	1	1	0	**5**	**2**	**2.5**
2005	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
2004	1	0	1	0	**4**	**2**	**2**
2003	1	0	1	1	**8**	**3**	**2.7**
2002	0	0	1	0	**3**	**1**	**3**
2001	0	0	0	1	**4**	**1**	**4**
	10	**6**	**7**	**7**	**71**	**30**	**2.43**

The findings for policy stringency are similar to those of the number of policies enacted in Mississippi, also illustrated in Table 4. Mississippi experienced some fluctuation in stringency over the years, but the stringency scores were consistent overall. Stringency scores were not overwhelmingly high in Mississippi and only 14 of the 30 obesity-related policies identified by the SLRA database were given stringency classifications of three and four. Seven of the policies fell into category three, direct policy influence without mandates and seven fell into category four, direct policy influence with mandates. Every year that an obesity-related policy is accounted for has at least one policy given a stringency classification of three or four. For example, in 2003, the only year where two stringent obesity-related policies were enacted, Mississippi enacted a policy that established a health and physical education advisory council

and a second policy that maintained support for the Mississippi Council on Obesity Prevention and Management.

The presence of a stringent policy in every year that an obesity-related policy was enacted led Mississippi to have the second highest stringency average of the four case studies, illustrating their effort to better address obesity. For example, the earlier years of the time frame between 2001 and 2004 indicated that the policies given stringency scores of three and four were designed with the intention of allocating funds to obesity-reducing programs. Stringent policies that focused on increasing physical activity in schools were more spread out over time, and laws fitting this description were passed in 2002, 2003, and 2007. Additionally, although poverty was mentioned as a factor in Mississippi's high obesity rates, the state did not begin enacting policies that increased the accessibility and affordability of fruits and vegetables until 2011. Policy pertaining to the accessibility of healthy foods continued into 2013 and 2014, although the stringency scores of these years reflected an overall decrease in policy stringency and number.

Lastly, although Mississippi had the second highest stringency average, the state ranked third in terms of total stringency scores, indicating that they were slow to adopt some of the early obesity policy initiatives taken by California and Colorado, as reflected in Mississippi's late emphasis on nutrition.

Proposition 1: *Casual state policy design addressing the obesity epidemic will be reflected in a consistently high prevalence of obesity and lack of change in obesity-policy number over time.*

Analysis of Mississippi's obesity-related policy change over time will be used to address proposition number one due to the state's designation as the state with consistently high rates of obesity. The content analysis of Mississippi's obesity-related policies between 2001 and 2015

supports that policies were consistent in number, stringency average, and stringency total, reflecting the high rate of obesity in the state. The number and stringency scores do not indicate policy inaction, but overall the number and stringency scores were consistent as expected, meaning Mississippi did not take significant policy steps to combat obesity.

Overall these findings indicate that although Mississippi was experiencing consistently high obesity rates, policy designs were not made more stringent. For example, although Mississippi had their highest stringency total in 2010, out of the seven policies enacted during that year, only one was given a stringency score of four, and the other six were given stringency scores of one and two, indicating a lack of policy design prescriptiveness. As reflected by the stringency averages, however, the policies did appear to better reflect the needs of the state over time. This was illustrated in the policy topics over time that moved from allocating funds to fight obesity to promoting physical activity for school-aged children, and then finally focusing on nutrition and making produce more easily available.

Overall, the findings in Mississippi are contrary to findings of Kingdon (1995), which argued that problem severity within a state leads to increased policy action by lawmakers. Although Mississippi did make some obesity-related policy changes, the level of political activity did not correlate with the level of obesity severity in the state.

Proposition 5: *A state with a consistently high prevalence of obesity will have obesity-related policies with low levels of stringency*.

Analysis of obesity-related policy in Mississippi was selected to address this proposition due to the focus on the state with consistently high obesity prevalence. The stringency score totals in Mississippi were third highest of the four case studies, which was expected given the state's high, but constant, prevalence of obesity. Although Mississippi did not take generous

strides in terms of increasing the stringency of their policies, there was always one policy given a stringency score of three or four for every year that Mississippi passed an obesity-related policy, which was reflected in Mississippi's second highest stringency average ranking of the four case studies. The years 2005 and 2015 are the exceptions because the state did not enact any obesity-reducing policies during these years. Overall, the findings do not support this proposition because although the stringency scores were consistent and did not increase to the degree needed to effectively combat obesity in the state, the analysis of the obesity-related policies in Mississippi are not considered to have low levels of stringency.

Colorado. Colorado was selected for this study due to its consistently low prevalence of obesity between 2001 and 2015, maintaining the lowest prevalence of obesity for all 50 states for every year during this time frame. The state government in Colorado has taken several steps to improve the health of its residents by ensuring that healthy choices are easily available at state agencies, worksites, schools, stores, and hospitals. Additionally, the governor's office has invested $100 million to improve the safety of sidewalks and parks with the intention of increasing physical activity and also making Colorado the best state for biking (Salley, 2015).

The effort of the government in Colorado to promote access to healthy food options and increase physical activity is reflected by its deep contrast in obesity prevalence compared to Mississippi. Despite the differences in obesity, Colorado only passed one more obesity-related policy between 2001 and 2015. Although both states had fairly consistent numbers of obesity-related policies between these years, the majority of Colorado's policies were enacted between 2002 and 2008, with state legislatures enacting between one and three policies for most years as illustrated in Table 5. Similar to Mississippi, Colorado increased the number of obesity-related policies it enacted in the years 2009 and 2010. Although Colorado consistently passed obesity-

related policies for every year between 2002 and 2011, the state refrained from enacting any obesity-related policies between 2013 and 2015. Despite the lack of obesity-related policies in 2013, 2014, and 2015, Colorado maintained their 50th place ranking for obesity prevalence, just as they had for the years 2002 through 2012.

Table 5. Colorado Policy Stringency and Number Scores

	Colorado						
	1	2	3	4	Stringency Total	Number Total	Stringency Average
2015	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
2014	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
2013	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
2012	0	0	0	1	**4**	**1**	**4**
2011	2	0	0	1	**6**	**3**	**2**
2010	0	2	1	2 1*	**19**	**6**	**3.2**
2009	1	4	0	0	**9**	**5**	**1.8**
2008	0	0	0	1	**4**	**1**	**4**
2007	2	1	0	1	**8**	**4**	**2**
2006	0	0	0	1	**4**	**1**	**4**
2005	0	1	1	1	**9**	**3**	**3**
2004	0	1	1	1*	**9**	**3**	**3**
2003	0	0	1	0	**3**	**1**	**3**
2002	0	1	2	0	**8**	**3**	**2.7**
2001	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
	5	**10**	**6**	**10**	**83**	**31**	**2.18**
	***Obesity policies are stringent, but not created with the intention of reducing obesity prevalence or improving social behaviors. For examples, policies that do not allow overweight individuals to sue companies that may have contributed to their weight gain.**						

The similarity between Mississippi and Colorado in terms of obesity-related policy was only reflected in the number and lack of intense fluctuation between 2001 and 2015. Colorado's total obesity-related policy stringency was higher than Mississippi's as indicated in Table 5. Other than 2010, when their stringency total jumped to 19, Colorado's stringency score totals

stayed primarily between 4 and 9, with one outlier of 3 in 2003, for the years that Colorado enacted obesity-related policies. Out of the four case studies, Colorado had the most policies classified as three, direct policy influence without mandates, and four, direct policy influence with mandates, and was the only state with more than half of their obesity-related policies assigned to these two categories, which is reflected in their stringency total.

The absence of obesity-related policies in Colorado between 2013 and 2015, led to a drop in their overall stringency average placing the state third out of the four case studies. It is likely that the consistently prescriptive nature of the state's obesity-related policies over time has allowed Colorado to maintain consistently low prevalence's of obesity in times of no policy action. In addition to having more prescriptive policies, many of the policies enacted in Colorado with stringency scores of three and four focused on improving nutrition at both the school and community level. Prescriptive nutrition policies were enacted in 2002, 2005, 2006, 2007, 2008, 2010, and 2012. Many of these policies focused on creating healthier environmental defaults such as making competitive foods at school healthier and taking trans-fats out of schools. This emphasis on nutrition may have led to the stability of obesity prevalence in the state even in years when obesity-related policies were not enacted.

Proposition 2: *Stringent state policy design addressing the obesity epidemic will be reflected in a consistent number of obesity-related policies and low prevalence of obesity over time.*

Analysis of the obesity-related policies in Colorado will be used to address this proposition because Colorado represents the state that has experienced a consistently low prevalence of obesity. The findings of the study indicate that the proposition is correct and Colorado did have consistently high levels of obesity stringency over time. Colorado had the

second highest stringency totals behind California, but was the only state to have over 50% of their policies given stringency scores of three and four. Many of the policies in Colorado that were classified as highly stringent, focused on improving the nutrition of Colorado residents. The enactment of policies that promoted healthy environmental defaults may have been the reason that obesity rates in the state did not increase, even in years when the Colorado legislature failed to enact any obesity-related policies.

Proposition 6: *A state with a consistently low prevalence of obesity will have highly stringent obesity-related policies*.

Colorado had the lowest prevalence of obesity of any state in the nation for all 15 years of the time frame being analyzed, but did not have the most stringent obesity-related policies during that time in terms of their stringency average or stringency total. The findings still support the proposition, however, because Colorado enacted more obesity-policies with stringency scores of three and four than any other state. This indicates that although Colorado did not pass a higher number of obesity-related policies than California, the policy design was prescriptive and effectively addressed obesity-reduction in the state, which likely contributed to a low prevalence of obesity in the state.

California. California was selected for this study due to its vast improvement in obesity-prevalence over time. California has a significant financial incentive to reduce the prevalence of obesity in the state because it spends more public and private money dealing with the consequences of obesity than any other state in the nation (Wolstein, Babey, & Diamant, 2015). Nutrition and physical activity are two factors that decrease the chances of becoming obese, but the large size of California means there is variation in accessibility to fresh produce and safe parks throughout the state. California also faces similar problems associated with poverty and

obesity that plague Mississippi, and individuals below the poverty line in California are more likely to become obese than those at or above the federal poverty line.

Between 2001 and 2015, California prioritized obesity-related policies and went from having the 23rd highest prevalence of obesity in the United States to the 47th highest prevalence of obesity. Compared to the other three case studies California passed considerably more obesity-related policies. Of the three other case studies, Mississippi enacted the most policies in one year, seven, which occurred in 2010. As demonstrated in Table 6, California had a significantly higher number of policies, with three years where they passed more than 10 policies, and two years when they enacted more than 20 policies. California had three years where only two obesity-related policies were enacted (2004, 2006, and 2015), but two of these years came after a year when 16 or more policies were enacted. Although, California did experience improvement in obesity prevalence over time, they started enacting a high number of policies in 2001, and consistently enacted large numbers of policies until 2011. California enacted a lower number of policies between 2012 and 2015 compared to previous years, but they still passed higher numbers of legislation than any other state during that time.

Table 6. California Policy Stringency and Number Scores

	California						
	1	2	3	4	Stringency Total	Number Total	Stringency Average
2015	1	0	1	0	**4**	**2**	**2**
2014	0	3	1	1	**13**	**5**	**2.6**
2013	0	1	1	2	**13**	**4**	**3.3**
2012	0	0	3	0	**9**	**3**	**3**
2011	4	2	2	1	**18**	**9**	**2**
2010	3	4	1	4	**30**	**12**	**2.5**
2009	2	5	0	0	**12**	**7**	**1.7**
2008	0	1	1	1	**9**	**3**	**3**
2007	0	12	9	4	**67**	**25**	**2.7**
2006	0	0	1	1	**7**	**2**	**3.5**

2005	5	9	5	4	**54**	**23**	**2.3**
2004	0	0	2	0	**6**	**2**	**3**
2003	1	4	9	2	**44**	**16**	**2.8**
2002	1	1	1	1	**10**	**4**	**2.5**
2001	1	4	2	3	**27**	**10**	**2.7**
	18	**46**	**39**	**24**	**323**	**127**	**2.64**

Comparable to number of policies, California had the highest stringency scores of any case study. One of their lowest stringency score totals (9) represented some of the highest stringency score totals in Colorado, Mississippi, and Wisconsin. California experienced two of their three lowest stringency score totals in 2004 (6) and 2006 (7), but the low numbers occurred after very high stringency score totals in 2003 (44) and 2005 (54). Their lowest stringency score totals occurred in 2015 (4), which is consistent with other low stringency score totals during that year. Although California's obesity rates improved more than any other state between 2003 and 2010, there was not a steady increase in enacted obesity policy stringency. For the most part obesity stringency score totals started high, and despite having some ups and downs, remained high compared to the other three case studies. For example, although obesity-related scores did not climb over 20 after 2007, they did remain consistently over 9, which may help explain why obesity rates in California have continued to improve.

In addition to high stringency score totals, California also had the highest stringency averages. For example, in 2005 and 2007, the years when California had their highest stringency scores, the policies focused primarily on community and school-related policies. It is possible that the policies put in place during these years made choices for physical activity and good nutrition more easily accessible, reducing the prevalence of obesity in California. In California the early years of policy focused on nutrition and physical activity as well as improving the

health of school children. From 2003 to 2005 the importance of policies creating environmental defaults in a community setting became more evident, which was reflected in the prevalence of highly stringent policies focusing on nutrition, awareness of physical activity, nutrition, and the need for cleaner and safer parks.

Proposition 3: *A state with policy designs increasing in stringency will experience decreasing obesity prevalence over time*.

Obesity-related policies were analyzed in California because the state experienced the largest improvement in obesity prevalence out of any other state in the nation between 2003 and 2010. It was expected that California would have obesity-related policies increasing in policy design prescriptiveness between 2001 and 2015, and the content analysis indicates that California obesity-policies partially demonstrated the expected trend. Although California, like Mississippi and Colorado, did experience variation in stringency scores, overall their stringency scores did increase between 2001 and 2007. One of the underlying assumptions of proposition three, however, is the stringency scores would begin low and increase over time resulting in the reduction of obesity prevalence. The findings indicated, however, that California already had highly stringency policies in 2001 that increased until 2007 before leveling out, but continued to remain strong until 2014.

Like, Colorado, many of the obesity-related policies enacted in California focused on nutrition and the creation of healthy environmental defaults, which could be a factor in the successful reduction of obesity prevalence in the state. For example, in 2001 California enacted a law establishing a pilot program that required competitive foods to meet specific nutrition requirements. This policy was one of four school nutrition-related laws to be enacted that year,

demonstrating a prioritization of nutrition and easy access to healthy foods for children in the early years of California's obesity-related policy process.

Wisconsin. In 2014, the University of Wisconsin's School of Medicine and Public Health committed $8.6 million dollars to combating the growing prevalence of obesity in the state. Included in this commitment was a $7.5 million grant from the Partnership Education and Research Committee to be used to promote collaborations between government entities, communities, researchers, advocates, non-profit organizations, and businesses, as well as the creation of a childhood obesity surveillance system (Wisconsin School of Medicine and Public Health, 2017). Despite the efforts of the University of Wisconsin to combat rising obesity rates, evidence of the same efforts by the Wisconsin government was difficult to find.

Policy could be an effective and important tool for the government of Wisconsin due to the state's distinction of increasing more in obesity prevalence than any other state between 2003 and 2010, which ultimately led to the inclusion of the state in this study. Overall, Wisconsin has taken few policy steps to combat obesity and enacted only 12 obesity-related policies between 2001 and 2015, which is less than half of the number enacted by the case study with the next lowest number of obesity-related policies. As illustrated in Table 7, Wisconsin only enacted obesity-related policies for five of the 15 years that were analyzed. Wisconsin did experience a jump in the number of obesity policies it enacted in 2009 and 2010, enacting twice the number of obesity-related policies in each of those two years than the other three years combined. Possible reasons for an increase in enacted obesity-related policies in 2009 and 2010 could relate to an increase in federal programs aimed at preventing obesity. For example, in 2008 the CDC's DNPAO issued several grants to states that would help reduce obesity rates and the funds were administered in 2010. Additionally, in February of 2009, President Obama passed the Children's

Health Insurance Program (CHIP), which allocated $25 million dollars to the reduction of childhood obesity and emphasized community-based activities as a means of obesity prevention. President Obama also signed the American Recovery and Reinvestment Act into law in February of 2009, which allocated $650 million to a prevention and wellness fund with the goal of improving the health of Americans. Each of these programs may have encouraged the Wisconsin state legislature to increase the number of obesity-related policies they enacted to better address the burdens related to obesity in their state (Trust for America's Health, 2009). Overall, the number of policies enacted in Wisconsin did increase, but not to a point where obesity rates would be impacted.

Table 7. Wisconsin Policy Stringency and Number Scores

	Wisconsin						
	1	2	3	4	Stringency Total	Number Total	Stringency Average
2015	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
2014	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
2013	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
2012	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
2011	1	0	0	0	**1**	**1**	**1**
2010	0	3	1	0	**9**	**4**	**2.25**
2009	3	1	0	0	**5**	**4**	**1.25**
2008	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
2007	0	1	1	0	**5**	**2**	**2.5**
2006	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
2005	0	0	0	1*	**4**	**1**	**4**
2004	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
2003	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
2002	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
2001	**0**	**0**	**0**	**N/A**	**0**	**0**	**0**
	4	**5**	**2**	**1**	**24**	**12**	**.73**
	***Obesity policies are stringent, but not created with the intention of reducing obesity prevalence or improving social behaviors. For examples, policies that do not allow overweight individuals to sue companies that may have contributed to their weight gain.**						

Wisconsin's stringency score totals did show some small improvements, but remained consistent overall for the five years where they enacted obesity-related policies. As shown in Table 7, between 2005 and 2007 the stringency score in the state increased by 1, from 4 to 5 and then remained stable for the year 2009, before increasing to 9 in 2010. In 2011 the stringency score decreased to 1. During the time frame of 2001 to 2015, Wisconsin only had two policies assigned a stringency classification of three and four, as reflected in their consistently low stringency average. The first policy given a stringency classification of three created Diabetes Awareness Month and the second policy with the stringency classification of three focused on using locally grown foods for school lunches as a way to improve the nutrition of Wisconsin school children. The one policy given a stringency classification of four had a negative relationship with obesity reduction and improvements in social behaviors, and instead prevented individuals from suing companies they felt were responsible for their weight gain. Despite the lack of policy, Wisconsin did experience a steady increase in policy stringency total for four of the five years they enacted policies, and did experience slight improvements in their obesity rates in 2010 and 2011, but the lack of obesity-policies after 2011 did correlate with an increase in obesity prevalence in 2012 (State of Obesity, 2016).

Proposition 4: *A state with policy designs decreasing in stringency will experience increases in obesity prevalence over time*.

The obesity-related policies in Wisconsin were used to address this proposition because Wisconsin experienced worsening obesity prevalence over time, more so than any other state. Overall, the findings indicate that Wisconsin took very few policy steps to combat worsening obesity rates, but do not support the proposition. The stringency score totals for the five years where policy was enacted either increased or maintained its stringency scores before decreasing

greatly in the final year that obesity-reducing policies were enacted. Despite an increase in policy stringency, however, the policy stringency averages in the state remained weak, and it is difficult to argue that Wisconsin increased the prescriptiveness of their obesity-related policy design as a means to combat worsening obesity rates.

Policy Stringency and Number Discussion. As previously mentioned, the purpose of selecting four case studies was to have four states that reflect different experiences with obesity prevalence and analyze their policy design response to increasing obesity rates within their states. In terms of the number of policies passed in each of the four case studies, the findings were contrary to Kingdon's (1995) argument that states would increase policy based on the severity of the problem, but consistent with findings by Niggel et al. (2015) that states do not increase the number of obesity-related policies based on increasing rates of obesity. Although Mississippi, and Wisconsin did experience some increase in the number of obesity-related policies as illustrated in Table 8, the overall trends indicated that increasing the number of obesity related policies was not done in a manner that effectively combated high obesity rates.

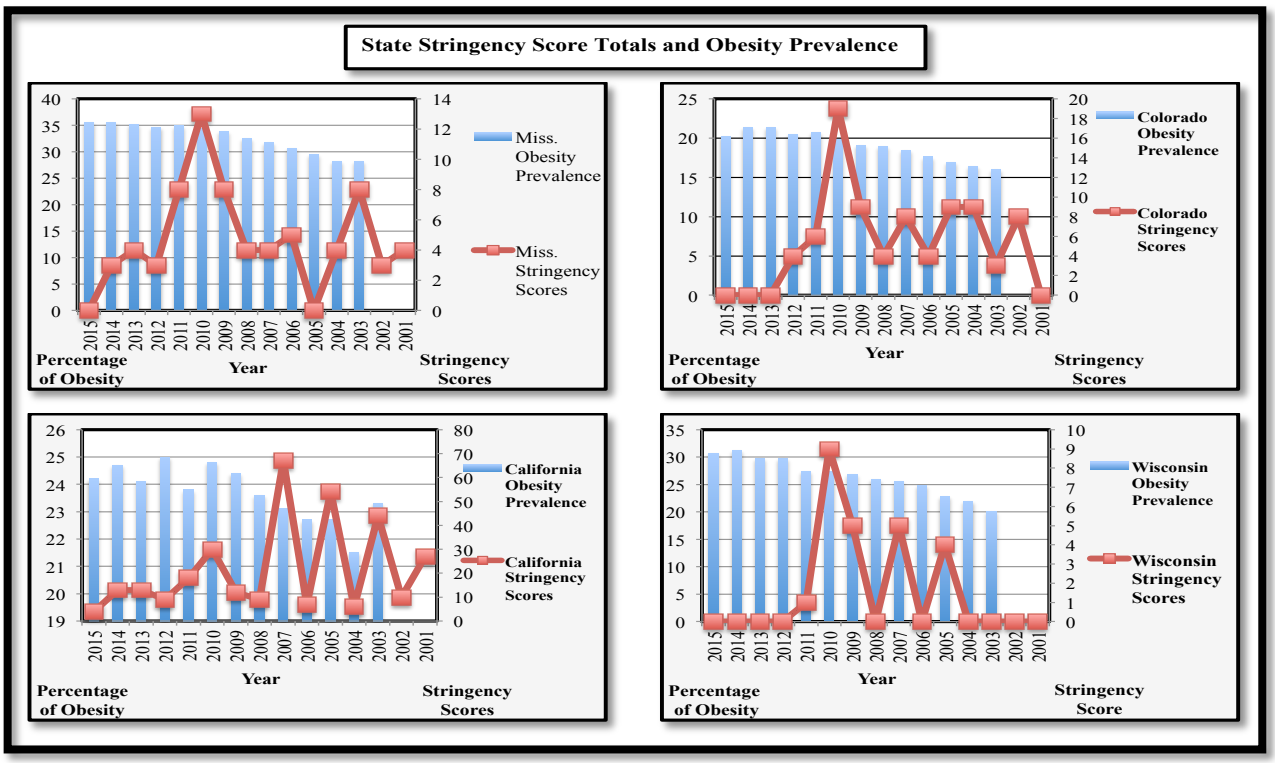
Table 8. Weighted Stringency Scores by Year and State

Weighted Stringency Score by Year & State								
Year	CA Average	CA Total	CO Average	CO Total	MS Average	MS Total	WI Average	WI Total
2015	2	4	0	0	0	0	0	0
2014	2.6	13	0	0	3	3	0	0
2013	3.3	13	0	0	4	4	0	0
2012	3	9	4	4	3	3	0	0
2011	2	18	2	6	2.7	8	1	1
2010	2.5	30	3.2	19	1.9	13	2.25	9
2009	1.7	12	1.8	9	1.6	8	1.25	5
2008	3	9	4	4	2	4	0	0
2007	2.7	67	2	8	4	4	2.5	5
2006	3.5	7	4	4	2.5	5	0	0

2005	2.3	54	3	9	0	0	4	4
2004	3	6	3	9	2	4	0	0
2003	2.8	44	3	3	2.7	8	0	0
2002	2.5	10	2.7	8	3	3	0	0
2001	2.7	27	0	0	4	4	0	0
	2.64	**323**	**2.18**	**83**	**2.43**	**71**	**.73**	**24**

In terms of stringency, the overall stringency scores of each state reflected their obesity prevalence positions, as shown in Figure 6. California had the highest stringency scores overall between 2001 and 2015, but the time frame between 2001 and 2007 revealed a steady trend of increasing obesity-related policy stringency. Although policies became less stringent after 2007, they still represented the strongest obesity-related policies of the four case studies, reflected by a drastic improvement in obesity prevalence. Taber et al. (2012) indicated in their study that California was at the forefront of obesity-related policies through an analysis of competitive foods in California, and the findings in this study are consistent with that conclusion. Although Colorado had the lowest prevalence of obesity out of the four case studies, their overall obesity policy stringency total score was second to California at 83. This is consistent with the proposition stating that Colorado would not increase the stringency of their obesity-related policies, but instead remain consistent, assuming that the prevalence of obesity in the state remained low.

Figure 6. State Obesity Prevalence and Stringency Score Totals Over Time



Although Mississippi had the highest prevalence of obesity, their stringency scores were not the lowest, and 46% of their obesity-related policies were given stringency classifications of three or four, meaning they were created with the intention of addressing obesity. Despite having some prescriptive policies related to obesity, their stringency score totals and averages were fairly consistent. This is in contrast to California who approached high obesity rates with a high number of stringent policies. Mississippi's actions were not enough to overcome increasing obesity rates. Overall, Wisconsin displayed a lack of political action in dealing with their state's increasing obesity rates. In addition to having the lowest number of obesity-related policies enacted, Wisconsin also had the lowest stringency score totals. Whereas Mississippi, Colorado, and California had between 46% and 53% of their obesity policies given stringency classifications of three and four, only 25% of Wisconsin's policies were given these scores.

Based on the severity of obesity in Mississippi and Wisconsin, both states could have benefited from enacting more, highly stringent policies because the slight increase in stringency was not enough to overcome the severity of the obesity problem in both states.

Lastly, Khan (2011) and Novak and Brownell (2012) argued that built environments and the creation of environmental defaults help determine whether or not an individual will become obese. Environmental defaults are policies that make health options more accessible like the mandated replacement of soda machines in schools with vending machines that only sell water, or policies that discourage fast food restaurants from putting locations near schools. It is likely that policy designers in each of the four case studies shared a similar view because a majority of the policies given strong stringency scores of three and four were in the setting of schools and community. This finding contradicts Bae et al. (2014), however, who found that states trying to improve child passenger safety seat regulations passed many different types of policies, with states passing stringent policies in one category, enacting less stringent policies in all other areas. This was not the case in this study, as all states analyzed had their most prescriptive policies in community and school settings.

Previous studies have indicated that many obesity-related bills successfully enacted are placed in the setting of schools, but as demonstrated in Appendix B, this study found that many policies also pertained to the community setting (Lankford, 2013; Marlow, 2014). Additionally, California and Colorado emphasized nutrition in their obesity-related policies, whereas Wisconsin did not, and Mississippi did not start focusing on nutrition as a means to reduce obesity until 2011. The findings illustrate that the level of focus on stringent nutrition policies by states is reflected in their prevalence of obesity. Nutrition and the creation of environmental

defaults may be a reason for improvement in obesity prevalence and should be further explored in future studies.

Part Two, Research Question Two: *What factors contribute to variation in the stringency of state obesity policies?*

Variation Findings by State-Level Characteristics

The second section of this chapter will present the findings for the potential state-level factors that explain variation in policy design stringency. The findings will be broken down by the five factors introduced in chapters two and three: state affluence, health interest group contributions, party of the state governor, party in control of the state legislature, and party of the policy sponsor. Each factor will then be analyzed by individual state and then collectively, before the corresponding proposition is addressed.

Affluence

Mississippi. In terms of per-capita real GDP, Mississippi's state wealth stayed fairly consistent between 2001 and 2015. As demonstrated in Table 9 between 2001 and 2008, Mississippi experienced its greatest growth in wealth increasing by $4,272 to $33,128 from $28,856. After this peak, however, state wealth dropped to $31,658 in 2009, where it remained stable until the end of the analyzed time frame in 2015. Mississippi's peak year of wealth was in 2008, two years prior to the state's highest obesity-related stringency score total in 2010. The 2011 stringency score totals, two years after the state experienced a $1,470 decrease in state per capita real GDP in 2009, illustrated a decrease in obesity-related policy stringency total from 13

to 8. A stringency score total of 8 was the second highest stringency score for the state, but stringency score totals continued to fall considerably for the years 2012 and 2014 before falling off in 2015. Although there appeared to be a trend between the state affluence in 2008 and 2009 and the impact on obesity-related stringency scores in 2010 and 2011, this pattern was not evident in any other analysis between state affluence and state stringency score totals.

Table 9. State Affluence

State Affluence and Stringency Score								
	California	**CA SS Total**	**Colorado**	**CO SS Total**	**Mississippi**	**MS SS Total**	**Wisconsin**	**WI SS Total**
2015	$56,851	4	$52,558	0	$31,504	0	$46,893	0
2014	$55,247	13	$51,899	0	$31,337	3	$46,469	0
2013	$53,746	13	$50,426	0	$31,648	4	$45,582	0
2012	$52,912	9	$49,622	4	$31,779	3	$45,380	0
2011	$52,067	18	$49,274	6	$31,169	8	$44,905	1
2010	$51,869	30	$49,258	19	$31,688	13	$44,126	9
2009	$51,733	12	$49,731	9	$31,658	8	$43,215	5
2008	$54,454	9	$51,651	4	$33,128	4	$44,622	0
2007	$55,154	67	$52,094	8	$32,041	4	$45,464	5
2006	$54,842	7	$51,515	4	$31,513	5	$45,515	0
2005	$53,320	54	$51,473	9	$30,813	0	$45,131	4
2004	$51,520	6	$50,083	9	$30,509	4	$44,455	0
2003	$49,501	44	$50,743	3	$30,139	8	$43,568	0
2002	$47,880	10	$50,870	8	$29,056	3	$42,694	0
2001	$47,216	27	$51,113	0	$28,856	4	$42,078	0
Average	**$52,554**	**323**	**$50,821**	**83**	**$31,123**	**71**	**$44,673**	**24**

Colorado. Colorado's state wealth remained fairly consistent between 2001 and 2014, fluctuating within two thousand dollars above and below their per capita real GDP in 2001. Colorado had their lowest per capita GPD in 2010 when they had their highest obesity-related policy stringency total. Analyzing the data in 2009, two years after they had their highest year of

wealth at $52,094 did not yield the highest stringency score total. Additionally, as state wealth began to increase in 2013, creeping above $50,000 for the first time since 2008, obesity-related policies dropped to zero. This decrease could reflect the need for Colorado to shift their focus from obesity prevention, which continued to maintain their low obesity prevalence through 2015, to areas of fiscal policy. Overall state affluence did not appear to influence the obesity-related stringency score totals in the state.

California. Of the four case studies, California experienced the largest increase in state wealth between 2001 and 2015, increasing by $9,635. The state experienced financial growth between 2001 and 2007, which is also when the state experienced the largest obesity-related policy stringency increase. Between 2008 and 2009, the per capita GPD of the state decreased by $2,721 and stabilized for the years 2010 and 2011 before beginning to climb again in 2012. Even in years when the stringency score totals decreased, they were still strong compared to totals in the other three case studies. Additionally, California's slight drop in stringency total after 2010, could indicate a shift in priorities from obesity to addressing the economic downturn. Although California had their highest per capita GPD in 2015, it was also the year with the lowest obesity-related policy stringency total. Overall it did not appear that state affluence explained changes in state stringency score totals.

Wisconsin. Wisconsin represents the second largest jump in state wealth after California. Between 2001 and 2015, the state increased their wealth by $4,815. Wisconsin experienced economic growth between 2001 and 2007, before falling in 2008. Compared to the other three case studies, Wisconsin appeared to recover quickly from their economic downturn and their wealth began to climb slowly again in 2010. The years, 2012 through 2015, when Wisconsin had their highest levels of wealth yielded no obesity-related policies. There does not appear to be any

trends that would explain a relationship between state affluence in Wisconsin and obesity-related stringency score totals.

Affluence State Comparison

The analysis of state wealth in Mississippi, Colorado, California, and Wisconsin indicates that differences in state affluence reflect changes in obesity-related stringency score totals. Although there did not appear to be a direct link between yearly changes in state affluence and future stringency score totals, the overall affluence trends between 2001 and 2015, reflect the trend in stringency score totals, with the exception of Wisconsin. Neither Colorado nor Mississippi experienced significant fluctuations in state wealth between 2001 and 2015, which was mirrored in their obesity policy stringency score totals. In Colorado this may be due to a lack of political pressure to increase the stringency of obesity-related policies because the state already had the lowest percentage of obesity in the nation, so they were able to maintain their current policy action and spend state funds on other policy problems. Alternatively, although Mississippi was in dire need of taking policy action that would prevent obesity, the lack of economic growth in the state may also reflect the high level of poverty within the state, and the need to prioritize alternative policy problems (Suddath, 2009). Mississippi's need to prioritize other policy problems, like poverty, may partially explain the consistent nature of obesity policy stringency score totals in the state.

Like Mississippi, California had an incentive to decrease state obesity rates due to the amount of private and public money spent on healthcare in the state (Wolstein, Babey, & Diamant, 2015). It appears that in California, unlike Mississippi, it was easier to make obesity prevention a policy priority, especially given the growing wealth of the state and the ability to

fund obesity prevention programs. Like, California, Wisconsin experienced an increase in state wealth between 2001 and 2015, making their lack of obesity-related policy action difficult to explain. This confusion is intensified due to initiatives taken at The University of Wisconsin to reduce obesity, worsening state obesity prevalence, and the economic success that indicates the state would be able to fund obesity prevention programs. Given the relationship between state wealth and obesity policy stringency totals in the other three case studies, their lack of obesity-related policy action was unexpected.

Proposition 7: *Affluent states will have more stringent obesity-related policy designs, reflected in a lower prevalence of obesity.*

Overall analysis of the per capita real GPD for every year between 2001 and 2015 in each of the four case studies indicated that a relationship between state affluence and obesity-related policy stringency totals did exist. For example, California's growth in state wealth between 2001 and 2007 reflected an overall trend of increasing obesity-related policy stringency totals. Colorado remained consistent in their per capita GDP, as did Mississippi, which was reflected in consistent obesity-related policy stringency score totals in both states. Wisconsin was the outlier in this analysis. The state experienced the second largest increase in state wealth between 2001 and 2015, which given the findings in the other three states, led to the assumption there would be an increase in their obesity-related policy stringency totals, but their increase in wealth was not reflected in their stringency score totals. Although the findings in three of the four states support the proposition that affluent states have more stringent obesity-related policies, the study cannot conclude that state affluence leads to changes in stringency score totals because there were no consistent trends that indicated a relationship exists.

The findings for Mississippi, Colorado, and California are consistent with the studies of Koski (2007b) and Yin and Powers (2010), which found that state affluence does influence variation in state policy stringency because more affluent states are more likely to contribute resources towards a policy problem. Unlike the other three case studies, the findings in Wisconsin indicated that there was no relationship between state affluence and the stringency totals of obesity-related policies that were enacted. The findings in Wisconsin are similar to those of Carley and Miller (2012) who did not find a relationship between state affluence and the stringency of policy in their research on renewable energy.

Health Interest Group Contributions

As mentioned in chapter three, to standardize the health interest group contributions due to the different sizes of the state case studies, the health interest group contribution dollar amounts collected from the National Institute on Money in State politics were divided by the state personal income and population of each state. As illustrated by the table in Appendix A, the standardization of the state personal income measure provided little variation across states. Therefore the analysis of the relationship between health interest group contributions and state obesity stringency will rely on state contribution scores taken from the division of state interest group contributions by each state population for every year between 2001 and 2015.

Mississippi. In terms of contributions of health interest groups and its impact on state obesity stringency in Mississippi, the contributions did not correlate with years when stringency score totals were the highest. For example, in 2010, Mississippi had their highest stringency score total of 13, but their health interest contribution score was only .12, well below their highest contribution score of .97 as illustrated in Table 10. The findings also did not support any

relationship between years of high health interest group contribution scores and high stringency score totals in following years. For example, in 2003 the state had its highest contribution score of .97, but stringency score totals fell and remained stable for the next five years before increasing from 4 to 8 in 2009, when the contribution score was .04. Overall, the health interest group contribution scores in Mississippi did not explain changes in stringency score totals over time.

Table 10. Health Interest Group Contribution Scores by State Population

Health Interest Group Contribution Scores by State Population and Stringency Scores								
	California	**CA SS**	**Colorado**	**CO SS**	**Mississippi**	**MS SS**	**Wisconsin**	**WI SS**
2015	**0.08**	4	**0.04**	0	**0.70**	0	**0.001**	0
2014	**2.67**	13	**0.95**	0	**0.17**	3	**0.013**	0
2013	**0.05**	13	**0.06**	0	**0.02**	4	**0.001**	0
2012	**0.72**	9	**0.30**	4	**0.25**	3	**0.015**	0
2011	**0.08**	18	**0.01**	6	**0.89**	8	**0.003**	1
2010	**0.63**	30	**0.62**	19	**0.12**	13	**0.015**	9
2009	**0.09**	12	**0.01**	9	**0.04**	8	**0.001**	5
2008	**0.76**	9	**0.45**	4	**0.08**	4	**0.005**	0
2007	**0.05**	67	**0.01**	8	**0.80**	4	**0.001**	5
2006	**0.86**	7	**0.17**	4	**0.00**	5	**0.010**	0
2005	**4.38**	54	**0.19**	9	**0.02**	0	**0.000**	4
2004	**0.72**	6	**0.28**	9	**0.12**	4	**0.003**	0
2003	**0.08**	44	**0.00**	3	**0.97**	8	**0.000**	0
2002	**0.42**	10	**0.19**	8	**0.10**	3	**0.006**	0
2001	**0.01**	27	**0.00**	0	**0.002**	4	**0.000**	0

Colorado. Colorado did not appear to have a strong relationship between the health interest group contribution scores and state stringency score totals. There were no indications that a high contribution score in one year led to high stringency score totals in following years. There was also no relationship between a strong health interest contribution year and a high

stringency score total in the same year. For example, 2014 was the highest interest group score of .95, but no obesity-related policies were enacted in that year. Overall, the findings in Colorado did not illustrate a strong relationship between health interest group contributions and high obesity policy stringency score totals.

California. California also did not demonstrate a strong relationship between health interest group contributions and changes in the stringency of obesity-related policies. There was some indication that a strong contribution year may lead to future increases in policy stringency totals based on the fact that the highest health contribution score of 4.38 in 2005 was followed by a peak stringency score total of 67 two years later in 2007. The connection between the high contribution score and high stringency scores was only evident for these two years, however, and there were no other findings that would indicate a relationship existed. Additionally, the content analysis did not support a relationship between large health interest group contributions and high stringency score totals in the same year. For example, in 2014 the health contribution score was 2.65 but the stringency score total remained the same as in 2013, and decreased in 2015 from 13 to 4. The findings in California did not support that health interest group contributions led to higher obesity policy stringency score totals.

Wisconsin. Consistent with the findings in the other three case studies, Wisconsin also did not appear to have a relationship between health interest group contributions and high stringency score totals. Wisconsin experienced their highest stringency score total in 2010, but the highest health contribution score of .015 occurred in 2012 when no obesity-related policies were enacted in the state. Additionally, there were no data that indicated a high interest group contribution in one year explained high stringency score totals in future years.

Health Interest Group State Comparison

The analysis of health interest group contributions did not appear to explain changes in stringency score totals for any of the four case studies. Prior to analysis of health interest group contributions, it seemed likely that California would have obesity policy stringency score totals that reflected health interest group contributions due to their substantial state wealth and need for obesity prevention to ensure low healthcare costs, as well as the large number of obesity-related policies that have been enacted in the state. In Mississippi the consistent stringency totals of obesity-related policies and high prevalence of obesity seemed to indicate a lack of health interest group attention on preventing obesity. It did seem likely, however, that if a relationship between health interest group contributions and obesity stringency score totals did exist that the contributions could be tied to interest groups fighting against government involvement in the social behavior of citizens.

In Colorado it seemed unlikely that the state would receive significant contributions from health interest groups due to the historically low prevalence of obesity in the state. Combined with the steady enactment of obesity-related policies over time, obesity prevention may receive less attention from health interest groups who choose to promote policies that reduce burdens caused by other health related policy problems. Lastly, the overall lack of obesity-related policy action in Wisconsin was a clear indicator that interest groups were not interested in influencing policy for or against obesity preventing legislation. Despite the possible reasons that health interest group contributions may reflect obesity policy stringency score totals in each state, none of the states demonstrated a relationship between health interest group contributions and changes in obesity policy stringency totals or explained why variation in obesity policy stringency exists across states.

Proposition 8: *States with strong health interest group influences will have more stringent obesity-related policy designs, reflected in a lower prevalence of obesity.*

The findings in each of the four case studies failed to support the proposition that strong health interest group contributions explain changes in the stringency totals of obesity-related policies. Although California had one case when a high stringency score total followed a large contribution from a health interest group two years later, there were no additional data that supported that the high stringency score totals was caused by the health interest group contribution. Additionally, none of the states had their highest stringency total in the same year that they had their largest health interest group contribution.

Overall, the findings for health interest group contributions differ from the research of Koski (2007b) and Dodson et al. (2009). Koski (2007b) found that interest groups significantly impacted policy stringency and Dodson et al. (2009) identified lobbyists as one of the two leading barriers to the enactment of obesity-related policies. This study, however, did not find a positive or negative relationship between health interest group contributions and the stringency total of obesity-related policies that would support either of the previous findings.

Party of State Governor

Mississippi. In Mississippi, Democrat, David Ronald Musgrove controlled the governor's mansion from 2001 until the 2004 election when Republican, Haley Barbour took control of the office. During the years of Democratic control the state maintained fairly consistent stringency score totals between 3 and 8. In 2005 after Barbour took office there was a year with no policies, but the state recovered in 2006 with a stringency score total of 5, and remained fairly stable until 2010 when the stringency score total peaked at 13. After the peak in

2010, stringency score totals fell slightly and continued to fall in 2012 when Barbour left office and was replaced by fellow Republican, Phil Bryant. In 2013 and 2014 the obesity-related stringency score totals were stable, but fell to zero in 2015. Overall, the obesity-related stringency score totals were fairly consistent between 2001 and 2015, but experienced a slight increase in 2004 when the Republicans gained control of the office of the governor.

Colorado. In Colorado the office of the governor has been fairly balanced in terms of party. At the beginning of the analyzed time frame in 2001 Governor Bill Owens, a Republican, was in office where he remained until 2007. Although no obesity-related policies were enacted in Colorado in 2001, in 2002 the state enacted their first obesity-related policies with a stringency score total of 8. Between 2004 and 2009, stringency score totals were consistently strong with scores of 8 and 9, except for 2006 and 2008 when the stringency total of the policies fell to 4. In 2007 Democrat, Bill Ritter was sworn into office until 2011 when John Hickenlooper, also a Democrat, took office. In 2008 and 2009 the scores were similar to those during Governor Owen's tenure, but peaked to 19 in 2010. After 2010, however, obesity-policy stringency score totals dropped to 6 and 4, and after 2012, Colorado did not pass any obesity-reducing policies between 2013 and 2015. Overall, it does not appear that the party of the governor influenced obesity-policy stringency score totals.

California. Between 2001 and 2015, both the Democratic and Republican parties were represented in the office of the governor. Democrats served as governor for six years, Republicans for seven, and two of the years were split between Republicans and Democrats due to mid-year elections. Governor Gray Davis, a Democrat was in office from 2001 to 2003 when the state had high stringency score totals. In 2003, Republican Arnold Schwarzenegger took office and was in control of the state's executive office when California achieved their most

stringent policy score totals in 2005 and 2007. During the remainder of Schwarzenegger's term, obesity stringency score totals remained strong. In 2011, Governor Edmund Brown, a Democrat, took office and maintained the high stringency score totals, but also had the lowest stringency score total in the analyzed time frame in 2015. Overall in California, combating obesity through policy seemed to be a bi-partisan effort and the party of the governor did not explain changes in obesity-related stringency score totals.

Wisconsin. During the analyzed time frame of 2001 to 2015, both Democrats and Republicans gained control of the office of the governor. Scott McCallum, a Republican was in the office between 2001 and 2003 and was replaced by Democrat, Jim Doyle who served until 2011. In 2011, current governor Scott Walker, a Republican took office. Republicans in the state did not have a strong record of policy enactment, and the one obesity-related policy enacted during Walker's time in office occurred during his first year in office when Doyle was finishing his term. Eleven of the 12 policies enacted between 2001 and 2015 occurred in years when Democrats were governor. Wisconsin reflected a strong correlation between Democratic governors and the enactment of obesity-related policies.

Party of the Governor State Comparison

Between 2001 and 2015 all four case studies had a Republican governor and a Democratic governor for at least one term. For this reason it seemed likely that party of the governor would explain variation in stringency among states. This was not the case in three of the four case studies, however, and only Wisconsin demonstrated a strong relationship between Democratic governors and more stringent obesity-related policy totals. In Wisconsin, a majority of the obesity-related policies were enacted under Democratic state executive leadership. None

of the other three case studies illustrated a relationship between party of the governor and changes in obesity policy stringency total. This was unexpected in Mississippi due to the dominance of Republicans in gubernatorial elections from 2005 to 2015. The stability of stringency score totals could be explained by a lack of obesity-related policy action by Democrats between 2001 and 2004, which set a low standard for Republicans to meet. Additionally, despite leaning left, California had a Republican governor from 2004 to 2011, and stringency score totals peaked during this timeframe and remained consistent for years of Democratic gubernatorial power. The findings were the same in Colorado and the election of a governor from a different political party did not lead to changes in stringency score total.

Proposition 9: *States with a Democratic governor will have more stringent obesity-related policy designs, reflected in a lower prevalence of obesity.*

The findings in three of the four case studies do not support this proposition. The findings in Wisconsin, however, do support the proposition that stringency score totals tend to be higher in years when a Democratic governor is in office. Alternatively, Colorado, California, and Mississippi all had consistent stringency score totals regardless of the party in control of the office of the governor. As shown in Table 11, the Colorado, California, and Mississippi case studies all had periods when power shifted between Republicans and Democrats, but there did not appear to be a major fluctuation in stringency score totals despite the party change. In Wisconsin, however, 11 of the 12 policies were enacted in years when Democratic Governor Doyle was in office. The 12th policy, however, was enacted in the final year of Doyle's governorship during an election year when Governor Walker took power and can most likely attributed to the work done by Doyle, not Walker.

Table 11. Political Party of State Governors

Political Party of State Governors and Stringency Scores								
	California	**CA SS**	**Colorado**	**CO SS**	**Mississippi**	**MS SS**	**Wisconsin**	**WI SS**
2015	Democrat	4	Democrat	0	Republican	0	Republican	0
2014	Democrat	13	Democrat	0	Republican	3	Republican	0
2013	Democrat	13	Democrat	0	Republican	4	Republican	0
2012	Democrat	9	Democrat	4	Republican	3	Republican	0
2011	Rep./Dem. (Election)	18	Democrat	6	Republican	8	Dem./Rep. (Election)	1
2010	Republican	30	Democrat	19	Republican	13	Democrat	9
2009	Republican	12	Democrat	9	Republican	8	Democrat	5
2008	Republican	9	Democrat	4	Republican	4	Democrat	0
2007	Republican	67	Rep./ Dem. (Election)	8	Republican	4	Democrat	5
2006	Republican	7	Republican	4	Republican	5	Democrat	0
2005	Republican	54	Republican	9	Republican	0	Democrat	4
2004	Republican	6	Republican	9	Dem./Rep. (Election)	4	Democrat	0
2003	Dem./Rep. (Election)	44	Republican	3	Democrat	8	Rep./Dem. (Election)	0
2002	Democrat	10	Republican	8	Democrat	3	Republican	0
2001	Democrat	27	Republican	0	Democrat	4	Republican	0

Previous research has indicated that the party of the governor is a significant indicator of obesity-related policy action (Cawley and Liu, 2008; Marlow, 2014). Only the findings for Wisconsin, however, were consistent with the research of Cawley and Liu (2008) who concluded that states with Democratic governors were more likely to support policies aimed at reducing obesity at the state level. The three other case studies maintained consistent levels of obesity policy stringency regardless of the political party of the governor. These findings are also inconsistent with research by Marlow (2014) who identified party of the governor as a solid indicator of state obesity policy action.

Party in Control of the State Legislature

Mississippi. Contrary to Mississippi's current position as a strong red state, Democrats controlled the state legislature from 2001 to 2011, before losing power to Republicans in 2012. Democrats maintained consistent stringency score totals that ranged between 4 and 8 during their time in power, peaking in 2010 with a score of 13. After Republicans took control of the legislature in 2012, stringency score totals fell slightly but remained consistent overall. The stringency score totals before and after the shift of power from Democrats to Republicans did not change significantly, meaning the party in control of the legislature in Mississippi does not explain changes in obesity-related stringency score totals.

Colorado. Compared to Mississippi, Colorado experienced several changes regarding which party was in control of the state legislature as illustrated in Table 12. In 2001, power of the legislature was divided between Republicans and Democrats until 2002 when the Republicans took sole control of the legislature for two years. In 2004, the Democrats began a seven-year reign, before the legislature became split again in 2011. In 2013, Democrats once again regained control of the legislature until 2015 when the legislature became divide once more. The years when no obesity-related policies were enacted occurred in terms when Democrats were in control or the government was split. For the two years that Republicans were in control there were four stringent obesity-related policies enacted, and two were given a stringency scores of three. Between the years 2002 and 2012, all three power structures existed; Republican control, Democratic control, and split control, but despite the differences in control, obesity policy stringency score totals remained stable. The exception is 2010 when stringency score totals peaked at 19 under Democratic control. There are no strong indicators that support the

proposition that Democratic control of the state legislature in Colorado explains increases in obesity-related stringency score totals.

Table 12. Party in Control of the State Legislature

State Party Legislative Control and Stringency Scores								
	California	**CA SS**	**Colorado**	**CO SS**	**Mississippi**	**MS SS**	**Wisconsin**	**WI SS**
2015	Democrat	4	Split	0	Republican	0	Split	0
2014	Democrat	13	Democrat	0	Republican	3	Republican	0
2013	Democrat	13	Democrat	0	Republican	4	Republican	0
2012	Democrat	9	Split	4	Republican	3	Republican	0
2011	Democrat	18	Split	6	Democrat	8	Republican	1
2010	Democrat	30	Democrat	19	Democrat	13	Democrat	9
2009	Democrat	12	Democrat	9	Democrat	8	Democrat	5
2008	Democrat	9	Democrat	4	Democrat	4	Democrat	0
2007	Democrat	67	Democrat	8	Democrat	4	Split	5
2006	Democrat	7	Democrat	4	Democrat	5	Split	0
2005	Democrat	54	Democrat	9	Democrat	0	Republican	4
2004	Democrat	6	Democrat	9	Democrat	4	Republican	0
2003	Democrat	44	Republican	3	Democrat	8	Republican	0
2002	Democrat	10	Republican	8	Democrat	3	Republican	0
2001	Democrat	27	Split	0	Democrat	4	Split	0

California. California is unique compared to the other three case studies because it is the only state that did not experience change in party control of the legislature between 2001 and 2015, as Democrats maintained control for all 15 years. Although the stringency score totals were consistently high for many of the years being analyzed, the lack of Republican control of the legislature did not allow for data comparison to identify whether stringency score totals would have been affected had Republicans gained control of the legislature for a term.

Wisconsin. Similar to Colorado, Wisconsin experienced many changes in party control of the legislature between 2001 and 2015. In 2001 the government was split between both parties

until Republicans took control of the legislature from 2002 to 2005. In 2006 and 2007 the legislature became divided again until Democrats took power in 2008 until 2010. From 2011 to 2014 the Republicans regained control until 2015 when the legislature became divided once again. When the first obesity-related policy was enacted in 2005, the Republicans were in control. The policy enacted was given a stringency classification of four, but the high score did not reflect legislation that intended to reduce obesity, but instead prevented obese individuals from suing businesses in the food industry for creating products that may have contributed to their obesity.

In 2007, Wisconsin enacted two obesity-related policies under a divided legislature, but the most policies and those with the highest stringency totals occurred when the Democratic Party controlled the legislature. In 2009 and 2010, eight total obesity-related policies were enacted and in 2010 the highest stringency score total of 9 occurred. After Republicans regained control in 2011 they enacted one obesity-related policy which was given a stringency score total of one, meaning it had little to do with reducing obesity in the state. Overall, although obesity-related policies were enacted under each of the three power structures: Republicans, Democrats, and split government, a higher number of policies and more stringent policies were enacted while Democrats were in power.

Party in Control of the State Legislature State Comparison

In terms of state party affiliation, California has a reputation for leaning Democratic and Mississippi has a reputation for leaning Republican, whereas Colorado and Wisconsin have a history of alternating party power. Although Mississippi has a reputation as a red state, Democrats controlled the state legislature for every year between 2001 and 2011. Despite the

shift in political party towards the right in 2011, there was only a slight decrease in stringency score totals after Republicans took control of the legislature and the totals were comparable to the stringency score totals of obesity policies enacted under Democratic power. Whereas Mississippi only had one legislative party change, Colorado had six changes in legislative party control between 2001 and 2015 with power alternating between split power and Republican power in the early years of analysis and then later alternating between Democratic power and a split house. Despite the numerous changes, however, the obesity policy stringency score totals remained consistent and did not vary significantly.

Wisconsin was the only state that illustrated a relationship between Democratic control of the legislature and obesity-related policies. Although obesity-related policies were passed in years where both the Republicans and Democrats had control of the legislature, the policies were more stringent in the years that Democrats were in control. Lastly, California was the only state that did not alternate party power of the legislature between 2001 and 2015 and therefore there was no comparison to indicate whether Republicans would enact obesity-related policies with different levels of stringency or not. Overall, party in control of the state legislature did not adequately explain changes in state obesity policy stringency totals.

Proposition 10: *States with Democratic control of the state legislature will have more stringent obesity related policy designs, reflected in a lower prevalence of obesity.*

Of the four case studies, only two of the states had findings that support the proposition. In California and Wisconsin there was evidence that Democratic control of the legislature led to the creation of more stringent policies. The findings in California did not provide any alternative explanations, however, because Democrats had control of the legislature for the entire analyzed time period. Wisconsin provides better evidence supporting this proposition because Republicans

and Democrats both had periods where they controlled the legislature, but also shared power in some years. The findings for California and Wisconsin support that Democrats not only passed a higher number of obesity-related policies, but also more stringent obesity-related policy.

The outcomes in Colorado and Mississippi did not support the proposition. Although the legislature was either controlled by Democrats or under shared power for a majority of the time frame analyzed in Colorado, Republicans were in control of the legislature in 2002 and 2003 when the first obesity-related policies were enacted in the state. There did not appear to be a significant change in obesity-policy stringency totals based on change in legislative control. This was similar to Mississippi where only one party change occurred when Republicans took control of the legislature in 2012, after 10 years of control by the Democrats. After the party change there was a slight decrease in stringency score totals, but overall stringency score totals remained stable until 2015 when no obesity-related policies were enacted in the state. There was a decrease in stringency score totals for all four case studies at this time, so it is likely that the lower stringency score totals in Mississippi in 2015 had more to do with external factors than Republican control of the legislature.

Overall, the findings in Colorado and Mississippi are not consistent with previous research that concluded Democratic control of the legislative houses was a strong indicator of state obesity policy action (Marlow, 2014). The findings are also not consistent with work by Cox, Kousser, and McCubbins (2010) who found that the party in control of the legislature has more agenda-setting power. For example, even though Wisconsin enacted more obesity-related policies when Democrats were in control of the legislature, there was not enough policy action to argue that they were flexing their political power or trying to make a policy statement about obesity. Additionally, although it may appear that the dominance of the Democratic Party in

California explained strong obesity policy stringency score totals in the state, there is no available information to explore whether Republicans in the state would have enacted policies with higher or lower levels of stringency. Overall, the findings in California weakly support the relationship between party in control of the legislature and obesity policy stringency score totals.

Party of Policy Sponsor

Mississippi. Of the four case studies, Mississippi was the only state that had more enacted obesity-related policies sponsored by Republicans than Democrats. As illustrated in Table 13, despite sponsoring more policies, Republicans only sponsored six policies that were given a stringency classification of three or four compared to eight highly stringent policies sponsored by Democrats. The findings in Mississippi do not indicate that Democrats are more likely to sponsor obesity-related policies, but does indicate that Democrats are more likely to enact more stringent policies.

Table 13. Mississippi Policy Sponsors by Party

Mississippi Policy Stringency by Party								
	1	**2**	**3**	**4**	**Democrat**	**Republican**	**Joint**	**Indep.**
2001	-	-	-	**D** (1)	1	0	0	0
2002	-	-	**D** (1)	-	1	0	0	0
2003	**R** (1)	-	**D** (1)	**D** (1)	2	1	0	0
2004	**D** (1)	-	**R** (1)	-	1	1	0	0
2005				**N/A**				
2006	-	**D** (1)	**D** (1)	-	2	0	0	0
2007	-	-	-	**R** (1)	0	1	0	0
2008	**R** (1)	-	**D** (1)	-	1	1	0	0
2009	**D** (3) **R** (1)	-	-	**D** (1)	4	1	0	0
2010	**R** (3)	**D** (1) **R** (2)	-	**D** (1)	2	5	0	0
2011	-	**R** (2)	-	**R** (1)	0	3	0	0
2012	-	-	**R** (1)	-	0	1	0	0
2013	-	-	-	**R** (1)	0	1	0	0

2014	-	-	**R** (1)	-	0	1	0	0
2015				**N/A**				
Total					**14**	**16**	**0**	**0**

Colorado. Analysis of party of the policy sponsor and state stringency score totals in Colorado indicated there was a strong correlation between the party of the policy sponsor and the sponsorship of obesity-related policies. As demonstrated in Table 14, in Colorado 24 of the 31 policies were sponsored by Democrats and seven by Republicans. Additionally, of the seven policies, only one was given a stringency classification of three or four. Two of the remaining six policies were given a stringency classification of one and had no impact on obesity reduction in the state, and the other four may influence obesity-reduction, but it was not the intention of the policy.

Table 14. Colorado Policy Sponsors by Party

Colorado Policy Stringency by Party								
	1	**2**	**3**	**4**	**Democrat**	**Republican**	**Joint**	**Indep.**
2002	-	**D** (1)	**D** (2)	-	3	0	0	0
2003	-	-	**D** (1)	-	1			
2004	-	**R** (1)	**D** (1)	**D** (1*)	2	1	0	0
2005	-	**R** (2)	**D** (1)	**D** (1)	2	1	0	0
2006	-	-	-	**D** (1)	1	0	0	0
2007	**D** (1) **R** (1)	**D** (1)	-	**D** (1)	3	1	0	0
2008	-	-	-	**D** (1)	1	0	0	0
2009	**R** (1)	**D** (3) **R** (1)	-	-	3	2	0	0
2010	-	**D** (1) **R** (1)	**D** (1)	**D** (2) **D** (1*)	5	1	0	0

2011	**D** (2)	-	-	**R** (1)	2	1	0	0
2012	-	-	-	**D** (1)	1	0	0	0
2013				**N/A**				
2014				**N/A**				
2015				**N/A**				
Total					**24**	**7**	**0**	**0**

California. In California the findings indicate a strong relationship between the political parties of the policy sponsor and the sponsorship of obesity-related policies. Between 2001 and 2015, a Democrat sponsored 104 of the 127 policies enacted, as indicated in Table 15. Republicans sponsored 13 of the obesity-related policies, but only two of the policies were given stringency classifications of three or four, meaning obesity-reduction was not their intent. Joint party committees sponsored nine of the remaining obesity-related policies, and an Independent sponsored one policy.

Table 15. California Policy Sponsors by Party

California Policy Stringency by Party								
	1	**2**	**3**	**4**	**Democrat**	**Republican**	**Joint**	**Indep.**
2001	**D** (1)	**D** (4)	**D** (2)	**D** (3)	10	0	0	0
2002	**D** (1)	**D** (1)	**D** (1)	**D** (1)	4	0	0	0
2003	**D** (1)	**D** (4)	**D** (8) **J** (1)	**D** (2)	15	0	1	0
2004	-	-	**D** (3)	-	2	0	0	0
2005	**D** (3) **R** (2)	**D** (4) **R** (4) **J** (1)	**D** (5)	**D** (3) **R** (1)	15	7	1	0
2006	-	-	**D** (1)	**D** (1)	2	0	0	0
2007	-	**D** (10) **R** (1) **J** (1)	**D** (7) **R** (1) **J** (1)	**D** (4)	21	2	2	0
2008	-	**D** (1)	**R** (1)	**D** (4)	2	1	0	0
2009	**D** (2)	**D** (4) **R** (1)	-	-	6	1	0	0

2010	**D** (2) **R** (1)	**D** (3) **J** (1)	**I** (1)	**D** (4)	9	1	1	1
2011	**D** (1) **R** (1) **J** (2)	**D** (2)	**D** (2)	**D** (1)	6	1	2	0
2012	-	-	**D** (1) **J** (2)	-	1	0	2	0
2013	-	**D** (1)	**D** (1)	**D** (2)	4	0	0	0
2014	-	**D** (3)	**D** (1)	**D** (1)	5	0	0	0
2015	**D** (1)	-	**D** (3)	-	2	0	0	0
Total					**104**	**13**	**9**	**1**

Wisconsin. In Wisconsin, Democrats sponsored more obesity related policies than Republicans with six. As shown in Table 16, Republicans sponsored three of the 12 policies and joint-party committees also sponsored three policies. In terms of stringency, only three policies had stringency classifications of three or higher. The one policy with a score of four was sponsored by a Republican and was not designed to reduce obesity, but instead prevent people from suing food companies for becoming obese. There were two policies given a stringency classification of three; one policy was sponsored by a Republican and the other by a Democrat. Although neither party nor the joint committees were successful in passing an obesity policy with a stringency classification of four that actually intended to reduce obesity, Democrats did sponsor more obesity-related policies than Republicans.

Table 16. Wisconsin Policy Sponsors by Party

Wisconsin Policy Stringency by Party								
	1	**2**	**3**	**4**	**Democrat**	**Republican**	**Joint**	**Indep.**
2001				**N/A**				
2002				**N/A**				
2003				**N/A**				
2004				**N/A**				
2005	-	-	-	**R** (4*)	0	1	0	0

2006				**N/A**				
2007	-	**J** (1)	**R** (1)	-	0	1	1	0
2008				**N/A**				
2009	**D** (2) **R** (1)	**D** (1)	-	-	3	1	0	0
2010	-	**D** (1) **J** (2)	**D** (1)	-	2	0	2	0
2011	**D** (1)	-	-	-	1	0	0	0
2012				**N/A**				
2013				**N/A**				
2014				**N/A**				
2015				**N/A**				
Total					**6**	**3**	**3**	**0**

Party of the Policy Sponsor State Comparison

Of the five factors being analyzed, party of the policy sponsor best explained changes in obesity policy stringency total, as stringent policies in each state were more likely to be sponsored by Democrats than Republicans. In California, the strong Democratic influence over the legislature was an indicator that a majority of the stringent obesity-related policies might be enacted by Democrats, which was ultimately the case. Unlike California, Colorado and Mississippi, experienced alternating party control of the state legislature and governor's office, but like California, Democrats sponsored more stringent obesity-related policies than Republicans. In Colorado only one stringent obesity-related policy was sponsored by a Republican. Additionally, despite Democratic control of the legislature in Mississippi until 2011, more obesity-related policies were sponsored by Republicans in the state. The policies were mainly symbolic, however, and Democrats sponsored most of the stringent obesity-related policies. Wisconsin also had alternating legislative and gubernatorial party power, which was reflected in the obesity-related policy sponsorship spread among Democrats, Republicans, and

joint committees. Although Democrats sponsored half of the 12 obesity-related policies, Democrats and Republicans each sponsored one stringent obesity-related policy. Overall, analysis of obesity policy sponsorship in all four states clearly indicates that policies sponsored by Democrats are more likely to be stringent than those sponsored by Republicans.

Proposition 11: *States where obesity-related policies have been predominately sponsored by Democrats will have more stringent obesity-related policy designs, reflected in a lower prevalence of obesity.*

Overall the findings in all four states indicate that the party of the policy sponsor is a determinant of whether obesity-related policies within the state will be more prescriptive or more casual. Mississippi was the one state where Republicans sponsored more obesity-related policies than Democrats, but the policies sponsored by Democrats were more stringent compared to those sponsored by Republicans. These findings are consistent with those of Koski (2007b), who determined that language and definition of the policy problem reflect the political ideologies of the state legislature sponsoring the bill. Koski (2007b) also argued that Democrats are more likely to support regulation of social behaviors, which supports the findings that Democrats were more likely to enact more stringent obesity-related policies than Republicans.

Case Study Summaries

Summary of Mississippi. Due to the high rates of obesity in Mississippi it was anticipated that obesity policy stringency score totals would be consistently low between 2001 and 2015. Although the stringency score totals were consistent overall, they were higher than expected and reflected mediocre attempts to address the alarming prevalence of obesity in the state. Analysis of the stringent policies in Mississippi, meaning policies given stringency

classifications of three and four, indicated that policy priorities changed over time, perhaps to better address obesity in the state, which was reflected in the state's second highest ranking for stringency average. For example, early policies focused on allocating funds to implement obesity-reducing programs followed by policies aimed at increasing physical activity, and finally in 2011, policies that improved nutrition in Mississippi residents.

There were also some surprising results in terms of the factors that were present in the same years that stringency score totals were high. There were three variables that analyzed political factors in the state: party of the policy sponsor, party of the governor, and party in control of the legislature, and Mississippi illustrated much more political party diversity than expected. When analyzing the party of the governor and the party in control of the state legislature, party control alternated between Republicans and Democrats and one specific party was not consistently present during periods of high policy stringency. This was not the case, however, for the party of the policy sponsor. For example, although Mississippi was the only state to have more Republicans sponsor obesity-reducing policies, policies enacted by Democrats were still found to be more stringent. In terms of the final two factors, health interest group contributions and state affluence, only state affluence appeared to reflect changes in stringency score totals. Mississippi had the lowest state wealth of the four case studies, which remained consistent from 2001 and 2015, and this was mirrored by the consistent nature of the stringency score totals.

Summary of Colorado. Like Mississippi, between 2001 and 2015, Colorado demonstrated consistent stringency score totals. The findings in Colorado are interesting because the state enacted only one more obesity-related policy than Mississippi during the analyzed time frame, but their stringency score totals, although consistent, were higher. Colorado also had four

years where they did not pass any obesity-related policies at all, two more than Mississippi, which resulted in the state ranking third behind Mississippi for stringency average. The main difference between the obesity-related policies enacted in Colorado and Mississippi was the content of the policies. Colorado focused on nutrition and providing easier access to healthy foods for a majority of the years that they enacted obesity-related policies, whereas Mississippi did not start to prioritize nutrition policies until 2011. Overall, the emphasis on making healthy decisions easier, as reflected by their stringency total, appeared to help Colorado maintain a low prevalence of obesity, even in years when obesity-related policies were not enacted.

In Colorado only two of the factors, party of the policy sponsor and affluence, appeared to reflect changes in stringency score total. Similar to Mississippi once again, Colorado had consistent levels of state wealth between 2001 and 2015, but was the second most affluent state of the four case studies. Comparatively, Colorado also had the second highest stringency score totals of the four case studies. Additionally, obesity policies sponsored by Democrats were consistently more stringent than those sponsored by Republicans. For example, 24 of the 31 obesity-related policies were sponsored by Democrats, and all but one of the stringent obesity-related policies were sponsored by Democrats. In terms of further studying obesity in these two states, it would be interesting to study the cultural differences between Mississippi and Colorado. The two states had similar outcomes in terms of the five factors that were present when each state had high obesity policy stringency score totals, and both states passed a similar number of policies, but have very different rates of obesity. Lastly, in 2013 Colorado experienced a drop-off in obesity-related policy action. Given the findings in Wisconsin it is recommended that the state legislature begin enacting highly stringent policies once again to avoid an increase in statewide obesity prevalence.

Summary of California. Due to the drastic improvement in obesity prevalence between 2003 and 2010, it was anticipated that obesity-related policies in California would increase in stringency over time, but the consistent strength of the state's obesity policy stringency for the entire analyzed timeframe was unexpected. For many of the years between 2001 and 2015, California passed not only a high number of obesity-related policies, but also highly stringent obesity-related policies, which helps explain the improvement in obesity prevalence. Like the other four case studies, policies sponsored by Democrats were more likely to be highly stringent than those sponsored by Republicans. Additionally, California's state wealth was the highest of the four case studies and reflected the stringency score totals within the state. Affluence in California is also important because the state spends more public and private money on healthcare than any other state in the nation and the wealth of the state increases the possibility that programs leading to the prevention of obesity will be supported (Wolstein et al., 2015; Yin and Powers, 2010).

In terms of party in control of the legislature, Democrats were the only party in control of the state legislature between 2001 and 2015, which did not provide any data for comparison of whether or not obesity-related policies would have been less prescriptive if Republicans had a period when they controlled the legislature. For much of the analyzed timeframe, however, Governor Arnold Schwarzenegger, a Republican, was governor and obesity-related policy stringency remained high. The consistency of the policy stringency score totals could reflect pressure from the Democratically controlled legislature, but also Governor Schwarzenegger's personal views on health as indicated by his past role as a body builder. Lastly, large contributions from health interest groups were not consistently present in the same years as high stringency score totals.

Summary of Wisconsin. As the state with the largest increase in obesity prevalence between 2003 and 2010, it was expected that Wisconsin would not pass many highly stringent obesity-related policies, but the overall lack of policy action addressing obesity in the state was not expected. Throughout the analyzed time frame, Wisconsin only enacted 12 policies and only two of the policies were designed with the intention of obesity-reduction. The other 10 policies had either low stringency levels, or were stringent but were not created with the intention of obesity reduction. In terms of affluence, Wisconsin had the second largest increase in state wealth behind California between 2001 and 2015. The findings in the other three case studies had demonstrated a correlation between state wealth and obesity policy stringency score totals, but this was not the case in Wisconsin and obesity-related policy inaction remained steady, even in years of economic growth.

Politically, it was evident that obesity-related action occurred primarily when Democrats were in control of the state legislature and governor's office. Democrats were also more likely to sponsor more obesity-related policies than Republicans, but Democrats only sponsored one obesity-related policy considered highly-stringent, the same number as Republicans. Overall, the lack of political support could be responsible for the inability of obesity-related policies to reflect increases in state wealth. Lastly, like the other three case studies, obesity-policy stringency score totals did not reflect changes in health interest group contributions.

Of all four case studies, Wisconsin may benefit the most from this study due to the effort put forth by the University of Wisconsin School of Medicine and Public Health to reduce obesity in the state. Analysis of the 200 policies has illustrated that although policies that allocate funds may be useful in the formation of programs; stringent and prescriptive policy design must be utilized to create healthier environmental defaults that improve nutrition as well as the social

behaviors that lead to individuals becoming obese. Applying findings from California to Wisconsin supports the idea that combining the grants and projects managed by the University of Wisconsin with support from the Wisconsin state government would lead to the eventual reduction of obesity in the state. Overall, designing prescriptive and stringent obesity-related policy is an imperative part of slowing and reversing the obesity epidemic that has plagued American states.

Results and Discussion Conclusion

Overall, the findings described in the "Results and Discussion" chapter provides insight into how states respond with policy when facing high obesity rates. Not all states utilize policy in the same way, despite the potential benefits of using policy to reduce obesity rates and relieve burdens on the state. Additionally, this chapter identifies the implications of states refusing to use the policy tools at their disposal. This chapter also identifies state determinants that explain changes in obesity policy stringency total and stringency average, as well as some factors that affect policy design in other policy areas, but not in obesity policy. As demonstrated in Appendix C, there are different levels of support for each of the 11 propositions, but even propositions with low levels of support added a valuable contribution to the study. Additionally, by addressing the 11 propositions in this study, this dissertation not only answered important questions regarding obesity-related policy stringency, but also identified areas of future study that can contribute to the fields of public policy, health policy, and public administration.

CHAPTER FIVE

CONCLUSION

The conclusion of this dissertation will begin by providing a brief summary of chapters one through three before addressing the research questions with the findings found in chapter four. Next, the implications and contributions to the literature will be explained. The dissertation will conclude with the limitations of the study and plans for future research.

Summary of Research

The purpose of this study was to identify whether the policy stringency of obesity-related legislation at the state-level changed as states experienced increases in obesity prevalence, as well as whether variation in policy stringency existed across states. Previous studies found that states do not increase the number of obesity-related policies they enact, despite evidence that indicates states could alleviate burden's on their government and save billions of dollars in healthcare costs (Niggel et al., 2013; Trust for America's Health, 2012). To better understand why some states make changes to the stringency of their obesity-related policies and others do not, policy design was selected as the theoretical foundation of this study to help identify what factors affect the creation of policies aimed at reducing social behaviors like obesity and how policy decisions vary from state to state (May, 1991).

To analyze changes in policy design and policy stringency, the decision was made to use a multiple case study design to address the issue of obesity-related policy design stringency as well as highlight the state factors that affected the creation of policy design and why states varied in the stringency of obesity-related policies despite addressing the same policy problem.

Additionally, the use of multiple case studies also helped compare and contrast the different policy design decisions that states made based on whether they had consistently high levels of obesity, consistently low levels of obesity, improved more than any other state in terms of obesity prevalence, or worsened the most. Moreover, this study created and utilized a unique obesity policy stringency categorization system, which helped identify the stringency of policies taken from the State Legislative and Regulation Action database and made it easy to track changes in state obesity-related policy stringency between 2001 and 2015.

Lastly, the comparison of stringency scores against policy determinants helped explain why variation in policy stringency exists, even as state governments address a similar policy problem. Each of the listed steps helped complete a study that fills a gap in the literature, which has so far failed to discuss how states react to rising obesity rates in terms of policy stringency. As indicated in the following sections that address the research questions, each state responded differently in terms of their policy action, despite attempting to overcome the same policy problem of obesity.

Addressing the Research Questions

Addressing Research Question One. The answer to research question one, "Has state obesity policy design, as reflected by obesity policy stringency, changed in prescriptiveness as obesity prevalence increased," is more difficult to answer than expected. Each state analyzed experienced fluctuation in policy stringency between 2001 and 2014, but overall the obesity-related stringency score totals in Mississippi, Colorado, and Wisconsin were fairly consistent with the exception of stringency score totals in 2010 for all three states. California experienced

the most movement in policy stringency, but still maintained an aspect of consistency due to the high stringency score totals and stringency averages that were evident in most years.

Although no state experienced significant fluctuation in their stringency score totals, this was expected in Mississippi and Colorado. Both states had a similar number of obesity-related policies, but the stringency score totals in Colorado were consistently higher, which most likely contributes to their contrasting experiences with obesity prevalence. Colorado was able to maintain a low prevalence of obesity despite having years with no policy action. Part of the reason for stability in their obesity rates could be due to their steady emphasis on nutrition policy, which helped create healthier environmental defaults. Alternatively, Mississippi did not emphasize nutrition policies until 2011, despite having a history of poverty for much of the time frame analyzed, which made access to health foods difficult for some state residents. Mississippi did, however, enact policy for 13 of the 15 years analyzed, making incremental improvements in the way the state used policy to address obesity. For that reason, even though the stringency score totals in Mississippi were lower than those of Colorado, it would be erroneous to claim that Mississippi did not take policy steps to address obesity in the state. Mississippi did take some steps to better address obesity, as reflected by their stringency averages, but they did not enact enough high stringency policies to make a substantial impact in their obesity prevalence or increase their stringency total ranking. Colorado could succeed with consistent policies because they were maintaining obesity rates and not trying to drastically improve them like Mississippi.

Mississippi could find success in reducing their obesity rates if they followed the policy steps that California has taken to decrease their prevalence of obesity. Despite years where there was a decrease in policy stringency, California had a very high number of highly stringent obesity-related policies for much of the time frame analyzed. It was unexpected that California

would have such high levels of stringency between 2001 and 2007. It was instead expected that California would have a gradual increase in policy stringency between 2001 and 2015. Many of the policies enacted in California focused on improving access to physical activity and improving nutrition, two leading causes of obesity. The strong and consistent emphasis on these policy areas is most likely responsible for improving levels of obesity prevalence, even in years of reduced policy action.

Analysis of obesity-related policy stringency in Wisconsin demonstrated the least amount of policy responsiveness to increasing obesity rates in the country. The years where Wisconsin enacted obesity-related policies were consistent, but overall it is more accurate to argue that Wisconsin chose the path of policy inaction to address its high prevalence of obesity. Overall, the findings indicate that changes in obesity-policy stringency were incremental in all four case studies.

Addressing Research Question Two. Five factors were selected for analysis in order to address the research question, "What factors contribute to variation in the stringency of state obesity policies?" Of the five factors; state affluence, contribution of health interest groups, party of the governor, party in control of the state legislature, and party of the policy sponsor, only three of the factors were consistently present in years of high obesity policy stringency and reflected variation in stringency score totals across states. The findings indicated that obesity-related policies that were sponsored by Democrats were more stringent than those that were sponsored by Republicans. These findings were consistent across all four case studies, including Mississippi where Republicans sponsored more obesity-related policies than Democrats, but the policies enacted by Republicans were consistently less stringent than those sponsored by Democrats.

In three of the four case studies, state affluence reflected the stringency of obesity policy in the state. For example, California and Colorado had the highest rate of state affluence, but also the lowest rates of obesity. Alternatively, Mississippi had the lowest state wealth of any of the four case studies, and also the highest prevalence of obesity. Wisconsin had the second largest growth in wealth between 2001 and 2015, but this was not evident in their state stringency score totals or state obesity prevalence like the other three case studies.

The third factor, party in control of the state legislature, demonstrated a relationship between party in control of the legislature and the stringency of obesity-policy in two of the four case studies. Analysis of obesity-policy stringency and the political parties in control of the legislature in Wisconsin and California, the two states with the most change in obesity prevalence between 2003 and 2010, demonstrated that years when Democrats were in control of the legislature coincided with years of higher obesity policy stringency. One complication is that California never had a Republican controlled legislature, so there was no data for comparison. In Wisconsin, however, obesity-related policies were most stringent in years that Democrats were in control of the state legislature. The findings in Mississippi and Colorado did not indicate that changes in party control of the state legislature explained changes in obesity policy stringency. Stringency score totals remained consistent in both states regardless of whether the legislature was split or solely controlled by Republicans or Democrats.

Although prior studies had found a relationship between interest group contributions and variation in policy stringency across states, this study did not find consistent changes in obesity policy stringency totals for years when states experienced increased health interest group activity (Koski, 2007b; Marlow, 2014; Cawley and Liu, 2008).

Implications of the Findings

Overall the findings of the study indicate that states with higher total obesity-related policy stringency scores have a lower prevalence of obesity than states with low total stringency scores. The contrasting findings between California and Wisconsin illustrate the benefits that strong policy over time can have on a state trying to combat rising obesity rates and alter the negative social behaviors of residents. Additionally, the comparison of Mississippi and Colorado demonstrates the need to enact highly stringent policies over time with an emphasis on policies that make healthy decisions more accessible to state residents. Mississippi had a higher stringency average than Colorado, indicating that they better addressed obesity annually, but did not have enough policy action to drastically improve the obesity prevalence of the state. Colorado's total stringency score illustrated that they had put in more overall effort between 2001 and 2015. Analysis of their policies demonstrated an emphasis on the creation of environmental defaults, which allowed the state to maintain low levels of obesity-related prevalence in years when they did not enact any obesity-related policies.

Lastly, this research also highlights the importance of studying policy stringency and the need for states to design policy in a prescriptive manner that directly aims to reduce obesity through the inclusion of mandates. This study has demonstrated that casual policies that do not provide mandates or specific language with the purpose of reducing obesity are ineffective and lack the ability to change the social behaviors that cause one to become obese.

Contributions to the Literature

Overall the findings in this dissertation add to the literature in three ways. First, this research adds a new dimension to the field of policy design by studying policy design stringency

in the capacity of health policy. Previous studies examining policy design and stringency had focused on renewable energy and concentrated animal feed operations, but had only minimally looked at any health related areas. The findings indicate that this extension to the field is important because not all of the indicators of state policy variation in the studies of Koski (2007a, 2007b), Yin & Powers (2009), and Carley and Miller (2012) were reflected in this study. These findings are key because they indicate that it cannot be assumed that policy stringency focusing on a specific policy problem are influenced by the same political factors like party of the governor or interest groups contributions, and that each policy problem must be viewed as distinct in the field of policy design stringency.

Secondly, this dissertation adds to studies that focused solely on the relationship between obesity prevalence and the number of obesity-related policies in a state. Analysis of obesity prevalence and the stringency of obesity-related policies, especially in Wisconsin and California, indicate that states that increase the number of highly stringent policies they enact will have experience an improvement in their obesity prevalence. Lastly, this study reconnects policy design theory to the field of public administration, a focus that has been severely overlooked in recent years (Howlett, 2009). The formation of policy design is important to the fields of public administration and public policy because it can be swayed by many different dynamics, and these elements can determine not only the content of the policy design, but also how effectively policy designs address a policy problem.

Overall, this study found that states that increased the stringency of their obesity related policies experienced an improvement in obesity prevalence. There are many different opinions on how involved the government should be in the intervention of social behaviors, and the

findings and stringency measures from this dissertation can be used in the research of other social behavior and policy design stringency studies.

Limitations of the Study

Overall, the findings indicate that states that increased the stringency of their obesity policy stringency experienced an improvement in obesity prevalence. One limitation of this study, however, is that the findings are limited only to these four states and cannot be generalized to the other 46 states in the country.

A second limitation is that although the methodology of this study is qualitative and relies on content analysis, there are quantitative components such as the stringency scores, number of policies, and state affluence in dollar amount. The reason for the qualitative study is because a study on obesity-policy stringency has not been previously completed and therefore a dependent variable that reflects stringency scores in all 50 states for the years 2001 through 2015 does not exist. In order to begin a discussion on the relationship between policy design and obesity policy stringency, the decision was made to focus on changes in obesity policy stringency as well as determinants that lead to variation in obesity policy stringency across states. Content analysis allowed for thick description of the findings and is an appropriate first step in studying policy design stringency in the area of obesity.

Future Research

To address the limitation associated with having quantitative components in the literature review, but using only a qualitative content analysis, there is a plan to do a larger study that codes obesity-related policies in all 50 states and analyzes the data using quantitative tests to

measure changes in stringency scores. This process will create a dependent variable for obesity policy stringency that can be used to explore questions of obesity-related policy stringency in future studies.

Secondly, analysis of obesity-related policies in California and Colorado indicated that states that focused on improving nutrition and creating healthy environmental defaults had the best obesity prevalence outcomes. Alternatively, Wisconsin enacted one nutrition related policy, and Mississippi did not begin to emphasis nutrition policies until 2011, which was reflected in the high obesity rates of both states. It would be pertinent to test the relationship between emphasis on nutrition policy and its impact on obesity prevalence at the state level by following this dissertation with a 50 state study that analyzes only nutrition policies to better identify if states that emphasized nutrition policies over other types of obesity-reducing policies had a lower prevalence of obesity than those that did not. This study could be easily accomplished by using the newly created dependent variable, obesity policy stringency, as proposed in the first area of future study.

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APPENDIX A

	CA State Personal Income	CO State Personal Income	MS State Personal Income	WI State Personal Income
2015	$3,198,065	$193,690	$2,106,572	$477,514
2015	2,103,669,473	277,731,754	104,045,259	264,987,588
	0.002	**0.001**	**0.020**	**0.002**
2014	$102,899,503	$5,109,940	$521,240	$4,150,843
2014	1,977,923,740	266,534,568	102,192,019	255,753,166
	0.05	**0.02**	**0.01**	**0.02**
2013	$1,988,287	$334,909	$43,700	$283,161
2013	1,861,956,514	246,648,165	99,663,477	245,382,484
	0.001	**0.001**	**0.0004**	**0.001**
2012	$27,574,774	$1,581,394	$755,554	$4,708,851
2012	1,838,567,162	234,005,901	98,264,480	243,576,466
	0.01	**0.01**	**0.01**	**0.02**
2011	$2,999,459	$58,208	$2,638,305	$977,879
2011	1,727,433,579	219,860,916	94,576,285	232,664,321
	0.002	**0.0003**	**0.028**	**0.004**
2010	$23,585,796	$3,141,896	$349,395	$4,642,269
2010	1,617,134,250	201,569,924	90,800,430	219,627,970
	0.01	**0.02**	**0.00**	**0.02**
2009	$3,165,615	$39,191	$109,100	$235,810
2009	1,560,649,328	198,082,468	88,174,096	215,498,897
	0.002	**0.000**	**0.001**	**0.001**
2008	$27,899,903	$2,213,576	$246,115	$1,596,489
2008	1,616,530,437	208,608,111	90,094,129	219,283,413
	0.02	**0.01**	**0.00**	**0.01**
2007	$1,959,154	$29,903	$2,338,833	$336,847
2007	1,583,851,546	201,743,269	85,615,593	210,810,973

	0.001	**0.000**	**0.027**	**0.002**
2006	$30,942,560	$786,255	$1,500	$3,098,263
2006	1,524,919,622	189,492,643	80,500,778	201,536,159
	$0.02	**$0.00**	**$0.00**	**$0.02**
2005	$156,951,943	$890,526	$67,511	$133,899
2005	1,415,940,822	176,129,181	77,222,001	189,528,086
	0.11	**0.01**	**0.00**	**0.00**
2004	$25,534,966	$1,295,071	$353,213	$923,380
2004	1,335,871,248	164,456,627	72,400,140	183,318,375
	0.02	**0.01**	**0.00**	**0.01**
2003	$2,675,645	$15,585	$2,796,247	$100,668
2003	1,242,098,548	159,102,588	68,443,211	175,771,213
	0.002	**0.000**	**0.041**	**0.001**
2002	$14,637,351	$856,602	$296,589	$1,646,421
	182,174,837	156,288,493	65,905,820	171,731,780
	0.08	**0.01**	**0.00**	**0.01**
2001	$192,454	($11,750)	$6,466	$63,264
2001	160,964,629	154,592,304	64,911,727	167,125,085
	0.001	**(0.0001)**	**0.0001**	**0.0004**

APPENDIX B

Stringent Policy Settings by State

Mississippi's Policy Settings			
	Stringency Category	**Bill Number**	**Setting**
2001	4	HB 1053	**Community**
2003	3	SB 2339	School
	4	HB 989	**Community**
2004	3	HB 1046	**Community**
2006	3*	HB 319	School
2007	4	SB 2369	School
2008	3	SCR 646	**Community**
2009	4	HB 1530	Medical/ Hospital
2010	4	HB 1078	School
2011	4	HB 1170	**Community**/ Restaurant
2012	3	HCR 112	School
2013	4	HB 718	School
2014	3	HB 1328	Restaurant/ Retail

California's Policy Settings			
	Stringency Category	**Bill Number**	**Setting**
2001	4	AB 1634	School
	3	AB 2024	School
	4	SB 19	School
	4	SB 56	School
	3	SCR 5	**Community**
2002	4	A 1793	School
	3	S 1868	School
2003	3	AB 195	School
	3	ACR 16	School
	3	ACR 70	**Community**
	4	SB 65	School
	3	SB 78	School
	4	SB 677	School
	3	SB 875	**Community**
	3	SB1485	**Community**
	3	SCR 27	School
	3	SCR 74	**Community**

	3	SCR 18	**Community**
2004	3	ACR 214	**Community**
	3	ACR 224	**Community**
2005	3	A 689	School
	4	A 1535	School
	3	A 2384	**Community**
	4	S 12	School
	4	S 281	School
	4	S 965	School
	3	SCR 4	Restaurant/ School
	3	SCR 33	**Community**
	3	SCR 90	**Community**
2006	4	ACR 114	**Community**
	3	SCR 105	**Community**
2007	3	SCR 76	**Community**
	3	SCR 66	**Community**
	3	SCR 39	**Community/** Workplace
	3	SCR 31	**Community**
	3	SCR 18	**Community**
	3*	S 602	School
	4	S 601	School
	4	S 490	School
	4	S 441	**Community**
	3	S80	School
	3	ACR 54	**Community/** School
	3	A 2726	**Community**
	4	A 97	**Community**
2008	4	S 1420	**Community**
	3	SCR 94	**Community**
2010	3	A 537	**Community/** Restaurant
	4	A 2084	Early Care/ Education
	4	S 1290	School
	4	S 1413	School
	4	SCR 73	School/ Workplace
2011	3	A 152	**Community**
	4	A 581	**Community**
	3	SCR 46	**Community**
2012	3	A 1467	**Community**
	3	ACR 161	**Community**
	3	S 1016	School

2013	4	AB 290	Early Care/ Education
	4	AB 626	School
	3	ACR 50	**Community**
2014	3	ACR 130	**Community**
	4	SB 949	School
2015	3	ACR 18	**Community**

Colorado's Policy Settings			
	Stringency Category	**Bill Number**	**Setting**
2002	3	HJR 1066	**Community**
	3	HR 1016	School
2003	3	SJR 45	**Community**
2004	3	SB 103	School
	4*	HB 1150	Restaurant/ Retail
2005	3	S 81	School
	4	H 1066	**Community**
2006	4	SB 127	School
2007	4	S 59	School
2008	4	S 129	School
2010	3	H 1160	Medical/ Hospital
	4	S 81	School
	4	S 106	**Community**/ Restaurant/ School
	4*	H 1191	**Community**/ Restaurant
2011	4	H 1069	School
2012	4	S68	School

Wisconsin's Policy Settings			
	Stringency Category	**Bill Number**	**Setting**
2005	4*	S 161	Restaurant/ Retail
2007	3	AJR 75	**Community**
2010	3	A 746	**Community/** School

APPENDIX C

Levels of Proposition Support Summary	
Propositions	**Level of Support**
High Level of Support	
Proposition 11: States where obesity-related policies have been predominately sponsored by Democrats will have more stringent obesity-related policy designs, reflected in a lower prevalence of obesity.	High: The findings were consistent across all four case studies that obesity-related policies sponsored by Democrats were more likely to be highly stringent than those sponsored by Republicans.
Proposition 2: Stringent state policy design addressing the obesity epidemic will be reflected in a consistent number of obesity-related policies and low prevalence of obesity over time.	High: Although Colorado enacted a similar number of obesity-related polices compared to Mississippi, their legislation was more stringent and prescriptive, which helped maintain a low prevalence of obesity in the state between 2001 and 2015.
Proposition 3: A state with policy designs increasing in stringency will experience decreasing obesity prevalence over time.	High: Analysis of obesity-related policies in California did indicate that a state increasing the stringency and prescriptiveness of their policies would experience an improvement in state obesity rates.
Proposition 7: Affluent states will have more stringent obesity-related policy designs, reflected in a lower prevalence of obesity.	High/ Outlier: Overall the state affluence scores in three of the four case studies reflect the changes in obesity prevalence. For example, California experienced the most improvement in state wealth and state obesity prevalence, whereas Colorado and Mississippi remained consistent in both state wealth and obesity prevalence. Wisconsin was the outlier and did not experience improvement in obesity prevalence or obesity-policy stringency despite improving second most in state affluence between 2001 and 2015.
High-Medium Level of Support	
Proposition 6: A state with a consistently low prevalence of obesity will have highly stringent obesity-related policies.	High/Medium: Although Colorado had the lowest prevalence of obesity between 2001 and 2015 the state did not have the highest stringency scores of the four states analyzed. The consistent nature of their obesity-related policies helped maintain low levels of stringency.
Medium Level of Support	
Proposition 1: Casual state policy design addressing the obesity epidemic will be	Medium: Although obesity policy stringency scores were consistent, obesity-related policy

reflected in a consistently high prevalence of obesity and lack of change in obesity-policy number over time.	in Mississippi did change over time to better address worsening obesity rates and were more stringent than expected. Despite some change, however, the mediocre level of obesity-related policy action did not lead to significant improvement in Mississippi's level of obesity prevalence.
Proposition 10: States with Democratic control of the state legislature will have more stringent obesity related policy designs, reflected in a lower prevalence of obesity.	Medium/ Split: California and Wisconsin supported the proposition, although California only had Democratic control of the state legislature so there was no comparison available for how Republican legislators would have reacted to rising obesity rates in the state. Alternatively, Mississippi and Colorado did not experience changes in obesity policy stringency as party in control of the state legislature changed.
Medium-Low Level of Support	
Proposition 5: A state with a consistently high prevalence of obesity will have obesity-related policies with low levels of stringency.	Medium/Low: Although Mississippi did not experience drastic improvement in their state obesity ranking between 2001 and 2015; the state did have higher stringency scores than expected. Of the 30 obesity-related policies enacted in the state, 14 were considered stringent, and policies changed over time to better address obesity.
Low Level of Support	
Proposition 9: States with a Democratic governor will have more stringent obesity-related policy designs, reflected in a lower prevalence of obesity.	Low/ Outlier: Only Wisconsin illustrated any indication that obesity-policy stringency scores were higher in years that Democrats controlled the governor's office. Colorado, California, and Mississippi all demonstrated consistency in their obesity policy stringency scores regardless of the political party of the governor.
Proposition 4: A state with policy designs decreasing in stringency will experience increases in obesity prevalence over time.	Low: Although Wisconsin experienced worsening obesity-rates they did not experience a decrease in obesity-policy stringency. The state either improved or maintained obesity stringency scores for three of the four years they enacted obesity-related policies. Overall the state took few policy steps to combat obesity.
Proposition 8: States with strong health interest group influences will have more	Low: The data did not support a relationship between health interest group contributions and

stringent obesity-related policy designs, reflected in a lower prevalence of obesity.	changes in obesity-policy stringency.

VITA

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